Volume 20, Number 4 | June 2021

The Orchadian

Official Journal of the Australasian Native Orchid Society Inc.

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Caladenia vulgaris var. *nunguensis* Arthur-Pieman Conservation Area, Tasmania Photo C. Broadfield

The Orchadian

Official Journal of the Australasian Native Orchid Society Inc.
Founded 1963. Dedicated to the study and conservation of Australasian native orchids.
Patron: David Cannon
ISSN 04774-3342
Volume 20, Number 4 | June 2021
Print Post Approved: 100000950

Contents

Editorial	Peter B. Adams	147
President's Report	Peter B. Adams	148
Notice of AGM		148
Caladenia vulgaris var. *nunguensis* (Orchidaceae), a New Narrow-range Endemic Taxon from Coastal Northwest Tasmania	Mark Wapstra and Craig Broadfield	149
The History of Merrellen Orchids	Ellen Gregory and Merril Newberry	161
The Orchid Breeding Program of Merrellen Orchids	Peter Adams and Sheryl Lawson	164
Plectorrhiza tridentata (Lindl.) Dockrill and Some Hybrids	Jeanne Dunn	169
Dendrobium Hybrids – The Australasian Blues	Roslyn Capell	174
Dendrobium cucumerinum MacLeay ex. Lindl. - Habitat and Cultural Observations	Owen Sengstock	178
Liparis coelogynoides 'Eungella Dreaming' CBR-AD-ACC/ANOS 2021 (NSW)	Gerry Walsh	180
Towards Green-flowering *Dendrobium* Section *Dendrocoryne* Hybrids	Richard Johnson	182
Vale Dr Geoff Stocker PhD BSc (For.) Dip. For. (1941–2021)	Bruce Gray	191

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Advertising Costs per Four Issues

June - March

1/6 page	$120.00
1/4 page	$160.00
1/2 page	$300.00

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Editorial

The list of contributors to *The Orchadian* continues to expand, with Ellen Gregory, Jeanne Dunn, Richard Johnson and Owen Sengstock. I thank all writers who have ensured that despite difficult times, there has been no interruption to publication.

Significantly, a new variant of the mainland and Tasmanian terrestrial orchid *Caladenia vulgaris* is formally described by Mark Wapstra and Craig Broadfield. Its occurrence is unusual for a *Caladenia,* in swampy conditions in the Arthur-Pieman Conservation Area in western Tasmania, where plants endure harsh conditions and can look different from those of less exposed regions. The paper was peer reviewed by orchid taxonomists in Australia and overseas herbaria.

Accounts of key Australian orchid people, including breeders are infrequent and eagerly sought. Ellen Gregory has provided a personal record of her parents, Ted and Barbara Gregory, who made major contributions to the breeding of cool growing *Dendrobium* species and hybrids. Sheryl Lawson and I made many visits to their nurseries at Mt. Tamborine (Qld) and Nabiac (NSW), and with the help of Alan Garrett and Greg Elliott, we have summarised the Merrellen Orchids catalogues with comments, and provided an overview of the breeding and growing. A key feature of their project was the close adherence over decades to a conviction that section Dendrocoryne would produce outstanding plants. The results bear this out and show the persistence required in successful breeding.

Jeanne Dunn grows and breeds Aeridinae epiphytes in a location and conditions not far removed from the natural habitat. She describes breeding with *Plectorrhiza tridentata* and other smaller growing species, with some initial results and more to come. Roslyn Capell and Richard Johnson focus on floral colour, in *Dendrobium* section *Spatulata,* and section *Dendrocoryne*, respectively. Blue flower colour is fairly unusual in the plant kingdom, and much desired, and *Spatulata* can deliver it fairly reliably using certain species. Green flowers are also difficult to produce in cool growing section *Dendrocoryne*, but there are a few successful results, perhaps some by accident rather than by design. Gerry Walsh has flowered a superb specimen of *Liparis coelogynoides*, and records how this was achieved. Owen Sengstock writes on *Dendrobium cucumerinum* in the natural habitat, and how he grows it successfully in a collection.

Peter Adams

President's Report

The Covid 19 pandemic continues to potentially restrict ANOS gatherings and events, with no end in sight this year. Travel arrangements and planning are still under a cloud of uncertainty. The AGM has been scheduled and is announced in this issue. It was not possible to hold an AGM last year, and it is hoped that members will make every effort to attend the meeting this year.

ANOS activities will proceed as far as possible for the remainder of the year, and there may be wide differences in what can occur in different states, and at different times, depending on restrictions. Shows and meetings are scheduled and should encourage and sustain members to further their orchid interests. I hope everyone is able to enjoy the forthcoming flowering season, especially the plants in their private collections.

ANOS Council is looking to encourage groups to inform our membership of their activities and local interests in growing and exhibiting their flowering plants, and of regional conservation concerns. The Council will soon be writing to all groups requesting information to be contributed either to *The Orchadian* or the newsletter so that there is more awareness and connection between people who share an appreciation of Australasian orchids.

Peter Adams

ANOS INC.

Notice of Annual General Meeting (AGM)

Date: Sunday 22nd August 2021

Time: 11 am - 1 pm

Venue: Albany Creek Community Centre

15 Ernie Street, Albany Creek, Qld

All positions will be declared vacant.

Nominations for all Council positions are called for, and must be in the hands of the Secretary no later than Saturday the 14th August 2021.

Nomination forms are available at www.anos.org.au:

Roslyn Capell, Secretary

Caladenia vulgaris var. *nunguensis* (Orchidaceae), a New Narrow-range Endemic Taxon from Coastal Northwest Tasmania

Text and Photos Mark Wapstra and Craig Broadfield | mark@ecotas.com.au

Abstract

Caladenia vulgaris var. *nunguensis* Wapstra & Broadfield is described as a new, apparently narrow-range endemic, a variety of *Caladenia vulgaris* D.L.Jones from near-coastal northwest Tasmania. The new taxon is morphologically distinct, characterised by its tall stature, long/wide leaf, and labellum ornamentation. The habitat of the species is ostensibly unique amongst Tasmanian taxa of *Caladenia*, inhabiting permanently waterlogged near-coastal windswept scrub and heath. The novel taxon will qualify as endangered under the Tasmanian *Threatened Species Protection Act 1995* and as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Key words. *Caladenia*, *nunguensis*, finger-orchid, taxonomy, Arthur-Pieman Conservation Area, boggy habitat, endangered, Tasmania.

Introduction

Tasmania has a rich orchid flora comprising approximately 15% of the State's native vascular flora (de Salas & Baker 2021). In Tasmania, the genus *Caladenia* (including taxa variously included in *Caladenia*, *Arachnorchis*, *Jonesiopsis*, *Stegostyla* and *Petalochilus*) is represented by 35 recognised taxa (de Salas & Baker 2020). Of these taxa, 15 are endemic to the State and 17 are listed as threatened on the Tasmanian *Threatened Species Protection Act 1995*. Despite a comprehensive taxonomic and nomenclatural review of *Caladenia* (Jones 1998), unfortunately much remains unresolved, especially in the *Caladenia patersonii* and *Caladenia carnea* species-complexes, but also within some closely related species-pairs e.g. *Caladenia alata-C. campbellii*. In recent years, additional taxa have been recognised as potentially present including *Caladenia cleistantha,* unconfirmed from a Bass Strait island, and *Caladenia catenata,* confirmed from sites on Flinders Island, although as yet not represented by formal collection.

In *Caladenia* there are large-flowered taxa, referred to as "spider-orchids", and smaller-flowered taxa, (often referred to as "finger-orchids". Within the small-flowered *Caladenia*, 19 taxa are recognised in Tasmania. The present paper describes a new taxon of small-flowered *Caladenia* in the *Petalochilus* section, recently detected from the State's northwest coast. This part of the State (between Pieman Heads and the northwest tip of the State) is widely recognised as a "hotspot" for endemic or southern limital species, and is particular rich in narrow-range endemic orchids (e.g. Jones et al. 1999).

Taxonomy

Caladenia vulgaris D.L.Jones var. ***nunguensis*** Wapstra & Broadfield var. *nov.*

***Type*: AUSTRALIA: TASMANIA.** north of West Point (nungu), 6 Nov. 2019, M. Wapstra, C. Broadfield & B. French s.n. (*holo:* HO 603336; *iso:* CANB, MEL).

Terrestrial *herb* growing singly or in small loose groups (but not distinctly clustered or colony-forming). *Tubers* globose to ovoid, 5.3-8.35 mm long, 4.5-6 mm wide. *Leaf* narrowly linear to linear, gently convex; erect to lax (often lying on ground or amongst dense grass); pale to mid-green (inner surface slightly darker and shinier than outer surface); midrib a gentle keel to obscure; base of leaf pale green with pink-red linear suffusions; leaf

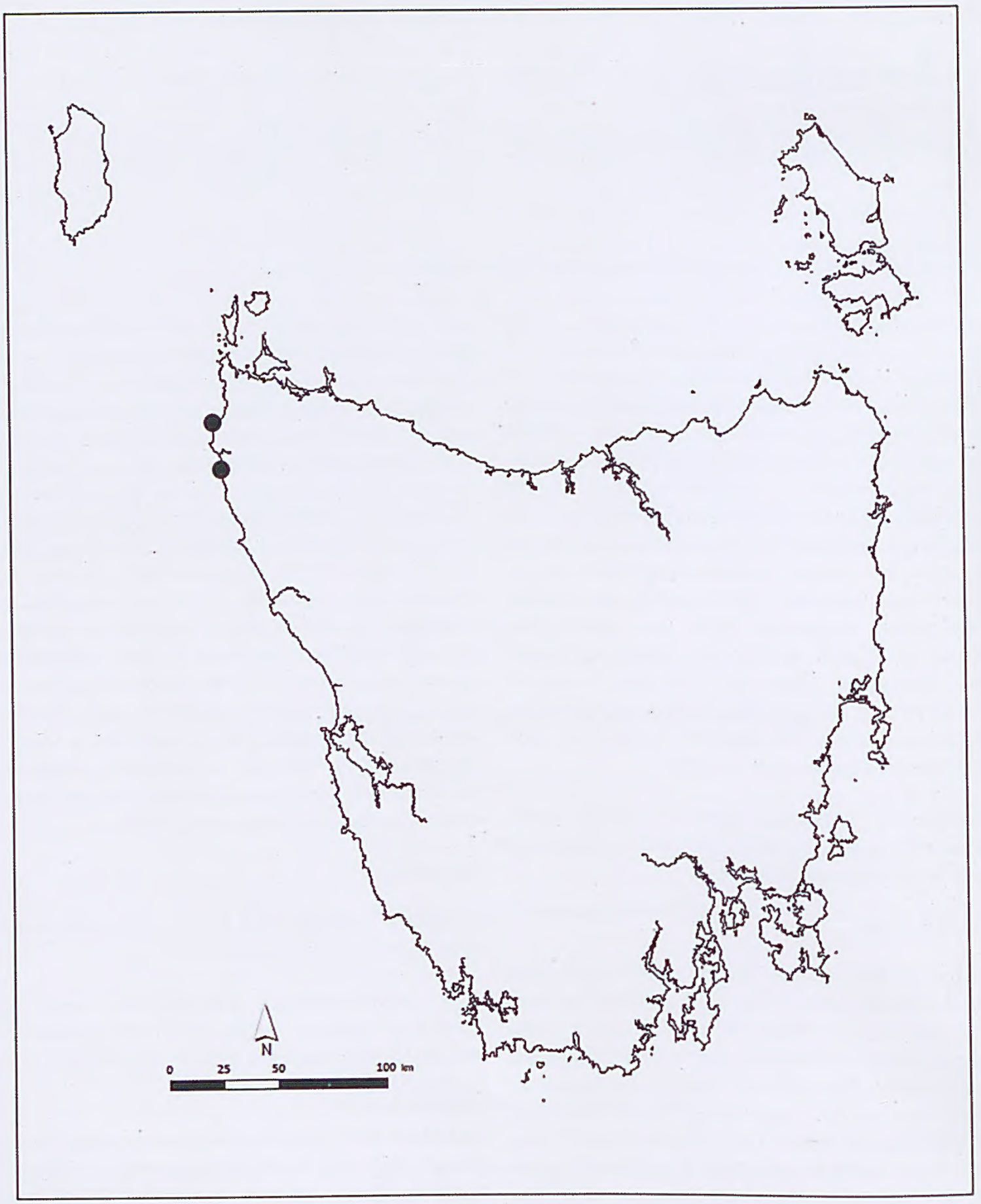

Figure 1. Distribution of *Caladenia vulgaris* var. *nunguensis*.

to 300 mm long (complete leaves held 30-80 mm higher than uppermost flower), 3.7-5.5 mm wide; adaxial surface virtually glabrous, outer surface with margins and lamina with multicellular white to translucent ca. 0.5-1 mm long glandular (translucent to pale pink glands) and eglandular trichomes, patent to loosely appressed. *Scape* 50-300 mm tall, shorter plants appearing to grow more in the open and taller plants amongst dense grass-graminoid vegetation (in 2(-3)-flowered specimens, ca. 120-240 mm to base of sterile bract below first flower); robust (1.2-3 mm diameter); stiffly erect; pale to mid-green to green-deep purple tending to green on upper section near flowers; sparsely to densely hirsute with multicellular white to translucent ca. 0.5-3 mm long glandular (pink glands) and eglandular trichomes, loosely patent. *Sterile bract* at about mid-scape; closely sheathing to distinctly spreading at about 5-15° from axis; narrowly obovate; 13-20.5 mm long, 2.2-2.6 mm wide; apex acute to acuminate; green with pink-red linear suffusions on outer surface; externally sparsely hirsute with cellular white to translucent ca. 0.5 mm long glandular (translucent to pale pink glands) and eglandular trichomes, loosely patent. *Ovary* narrowly elongated (but not prominently swollen when in bud); 6-15 mm long, 1.5-3 mm wide, widening distally; green with 3 dark red raised bands (sometimes obscure), the bands densely glandular with pink-tipped trichomes 0.1-0.2 mm long; *Floral bracts* closely sheathing to slightly divergent; narrowly obovate; 10-13 mm long, 2.2-3.1 mm wide; apex gently tapered in apical quarter; pale green with margins and apex suffused with red; trichomes similar to sterile bract. *Flowers* 1-2 (rarely 3); 15-20 mm across when at full anthesis; upper flowers (when present) on pedicel 15-35 mm long, held at an angle of ca. 15-25° from main axis, upper flowers held at or above level of lower flower; pale pink to cream internally, externally similar but tepals with distinct pink to deep red bands (distinctive in bud from a distance amongst green "background" of habitat); labellum cream with reddish-pink bars and a pale yellow apex; not obviously scented. *Dorsal sepal* narrowly obovate; apex subacute; erect to incurved over column; 9.35-11.8 mm long, 2.2-2.6 mm wide; externally greenish with pale to deep reddish central band and sparse suffusions of pink-red, internally cream suffused with pink; outer surface with sparse very short (ca. 0.25 mm) patent white eglandular trichomes and sparse translucent to pale pink glandular trichomes near base; distal surface with low dark red papillae; inner surface glabrous for most of length with short white hairs near base. *Lateral sepals* oblanceolate; projecting forward horizontally, the base free to fused in the first ca. 0.25-0.5 mm; apex bluntly acute; 9.5-12 mm long, 3-4.5 mm wide; externally greenish-cream with dark reddish-pink band, internally pale pink; trichomes and papillae similar to dorsal sepal. *Petals* narrowly obovate; apex acute; 9.4-11.9 mm long, 2.2-3.6 mm wide; externally pale pink with greenish to darker red central band, internally pale pink; trichomes similar to dorsal sepal and lateral sepals, papillae sparser. *Labellum* hinged at the base with a very short claw. *Lamina of labellum* prominently 3-lobed, transversely elliptic-obovate when flattened; erect in proximal third, gently curved to horizontal through centre, apex recurved to held horizontal (depending on age of flower). *Lateral lobes of labellum* erect to gently outcurved (less often more column-embracing); margins entire, smooth; ca. 2-2.55 mm high at widest point; bluntly rounded back to base of labellum; externally cream with obscure dark red bars. *Mid-lobe of labellum* narrowly triangular, distinct from lateral lobes and lamina; cream to white; 5-6 paired marginal, blunt dull/pale yellow, papillate (at high magnification) teeth becoming obscure towards apex; apex narrowly acute; 2.5 mm long, 1.5 mm wide (at base). *Lamina calli* in two somewhat irregular rows with 10-12 loosely paired dark red bars on a white-cream background; 9-10 loosely paired, shortly stalked (0.2-0.3 mm), cream suffused with pink, calli topped with papillate dull yellow heads, extending to base of the mid-lobe. *Basal calli* 4-6, very loosely paired to clustered; stalks 0.3-0.5 mm, heads of stalk papillate, dull yellow. *Column* externally greenish with 8 loosely paired and non-coalescing red bars on wings, apex suffused with darker red; externally slightly shortly hispid with white hairs, mainly associated with distal reddish area; internally greenish with non-coalescing red bars internally on rear of column and wings; 6 mm long, ca. 1.8-2.0 mm wide; erect, curved forwards slightly in distal quarter; narrowly but distinctly winged, the wings parallel to one another to slightly incurved; central anterior ridge of column ca. 1.2 mm wide. *Anther* pinkish-white to deeper pink on dorsal surface, ca. 1.4 mm wide, densely papillate; rostrum prominent, projecting forward to slightly curved downward,

Plate 1. *Caladenia vulgaris* var. *nunguensis*, images of same plant. Garth Smith 28 Oct. 2019

white-cream; ca. 0.3 mm long. *Pollinia* four; ca. 1 mm long; gently curved; white; mealy. *Stigma* more or less circular; ca. 1.3 mm wide, sunken; pale green. *Capsule* not seen. Plates 1-7.

***Selected specimens*: AUSTRALIA: TASMANIA.** north of West Point (nungu), 18 Nov. 2018, C. Broadfield s.n. (HO 603337).

***Other confirmed observations:* AUSTRALIA: TASMANIA.** near Sundown Point (laraturunawn), 23 Nov. 2018, C. Broadfield, no collection made (one individual only), specimen identified from digital image (Plate 8).

***Diagnostic features*:** Tall stature; long and wide leaf that extends well beyond inflorescence; hairy scape; pale pink flowers; tepals with distinct pink to deep red bands (distinctive in bud from a distance amongst green "background" of habitat); labellum cream with reddish-pink uncoalesced bars and a pale yellow apex; calli of labellum all dull yellow; growing in seasonally-inundated sedgeland.

***Flowering period*:** Flowers in spring, with an apparent peak in mid to late November.

***Distribution and habitat*:** *Caladenia vulgaris* var. *nunguensis* has an apparently limited geographic range, currently only known from two sites on Tasmania's northwest coast (Figure 1). One site is just north of nungu / West Point, and close to Nettley Bay, south of the township of Marrawah: the other ca. 22 km further south near laraturunawn / Sundown Point.

At nungu / West Point, the taxon occurs in low windswept scrub (Plates 9-12) dominated by *Melaleuca squarrosa* and *Leptospermum scoparium* with *Banksia marginata*, *Aotus ericoides*, *Pultenaea daphnoides*, *Melaleuca ericifolia*, *Leucopogon parviflora*, *Acacia verticillata*, *Bauera rubioides* and *Epacris lanuginosa*. The waterlogged soils support a suite of Cyperaceae/Restionaceae including *Eleocharis acuta*, *Baumea acuta*, *Ficinia nodosa* and *Empodisma minus*. Water-loving herbs and ferns include *Centella cordifolia*, *Selaginella uliginosa*, *Lobelia alata*, *Cotula filicula*, *Isolepis* species, *Villarsia umbricola* and *Blechnum wattsii*. The species extends into the marginally less waterlogged fringes of the drain habitat, which includes species such as *Poa labillardierei*, *Dianella revoluta* and *Lomandra longifolia*. Near laraturunawn / Sundown Point, the habitat (Plate 12) is very similar although the adjacent scrub habitat is dominated by *Melaleuca ericifolia* and *Lepidosperma elatius* is present.

Extension surveys undertaken in 2019 during the peak flowering period targeted apparently similar habitat to the two known sites. No further sites were detected. While potential habitat is superficially widespread, the combination of site features required by the taxon may be much more limited.

Abundance and extent: The site north of nungu / West Point is estimated to cover ca. 250 m^2. In the year of first discovery (2018), an informal assessment indicated ca. 12 or so plants (but note the survey was by no means extensive nor intensive). In 2019, a more focussed assessment revealed 134 plants in various stages of growth, but it is likely many were missed, due to part or complete loss by grazing, so we believe ca. 200 is a fair estimate. Only ca. 20 plants were observed in 2020, with only three in flower. We suspect grazing is the main cause of the apparent fluctuations. The site near laraturunawn / Sundown Point supports one individual (C. Broadfield pers. obs. 18 Nov. 2018), with potential habitat estimated at ca. 200 m^2. Follow-up surveys in 2019 failed to locate any specimens.

***Reservation status*:** The main population of *C. vulgaris* var. *nunguensis* occurs on private property, immediately adjacent to the West Point State Reserve. The population may marginally extend into the reserve to the south. The site with a single individual recorded near laraturunawn / Sundown Point is in the Arthur-Pieman Conservation Area, which affords some level of legislated protection to the taxon.

***Threats*:** There are no direct threats to the population near laraturunawn / Sundown Point, although at present it is represented by a single individual, presumably subject to stochastic risk due to small population size. The main population north of nungu / West Point is on private property, which has been recently fenced internal to the reserve boundary, effectively isolating the boggy habitat of the species from adjacent better-drained terrain to the north which is used for grazing. As part of the fencing of the bog, a drain was constructed along the fence,

Plate 2. Budding 2-flowered plant showing distinctive red-striped green buds, hirsute scape and wide, slightly hairy leaf continuing well beyond inflorescence. 6 Nov. 2019

Plate 3. Scape, bract and upper part of leaf of *Caladenia vulgaris* var. *nunguensis*. 9 Nov. 2019

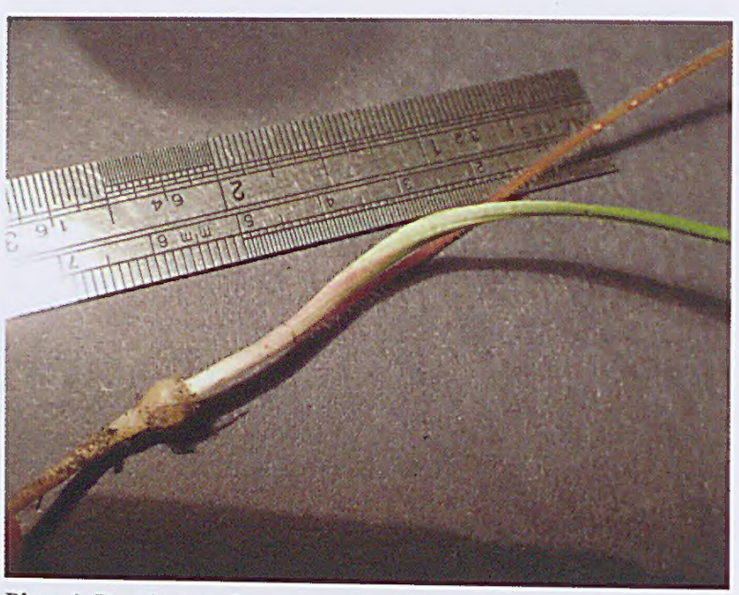

Plate 4. Basal part of scape and leaf of *Caladenia vulgaris* var. *nunguensis* showing pale green leaf colour, the base with pink-red linear suffusions. 22 Nov. 2018

Plate 5. Basal part of scape and leaf of *Caladenia vulgaris* var. *nunguensis* showing wide, pale green, only slightly hairy leaf and purple based and hairy scape. Photo G. Smith 28 Oct. 2019

with the dug spoil being piled on the southern side of the drain partially covering what was presumed to be the northern extent of the population. Whether the population extended to the disturbed area is not known.

***Conservation status*:** Based on the number of subpopulations (2), number of mature individuals (ca. 200 but certainly less than 250 known to date), extent of occurrence (linear range of ca. 22 km), area of occupancy (ca. 250 m^2) and inferred/observed threats, *C. vulgaris* var. *nunguensis* is considered to qualify as endangered (Schedule 3) on the Tasmanian *Threatened Species Protection Act 1995*. A similar, or even higher conservation status i.e. Critically Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA), is also considered appropriate (see notes on the EPBCA in Discussion).

***Etymology*:** The varietal epithet refers to the Tasmanian Aboriginal name for the West Point area, nungu, in recognition of the close connection of this species to this part of the State, shared by the

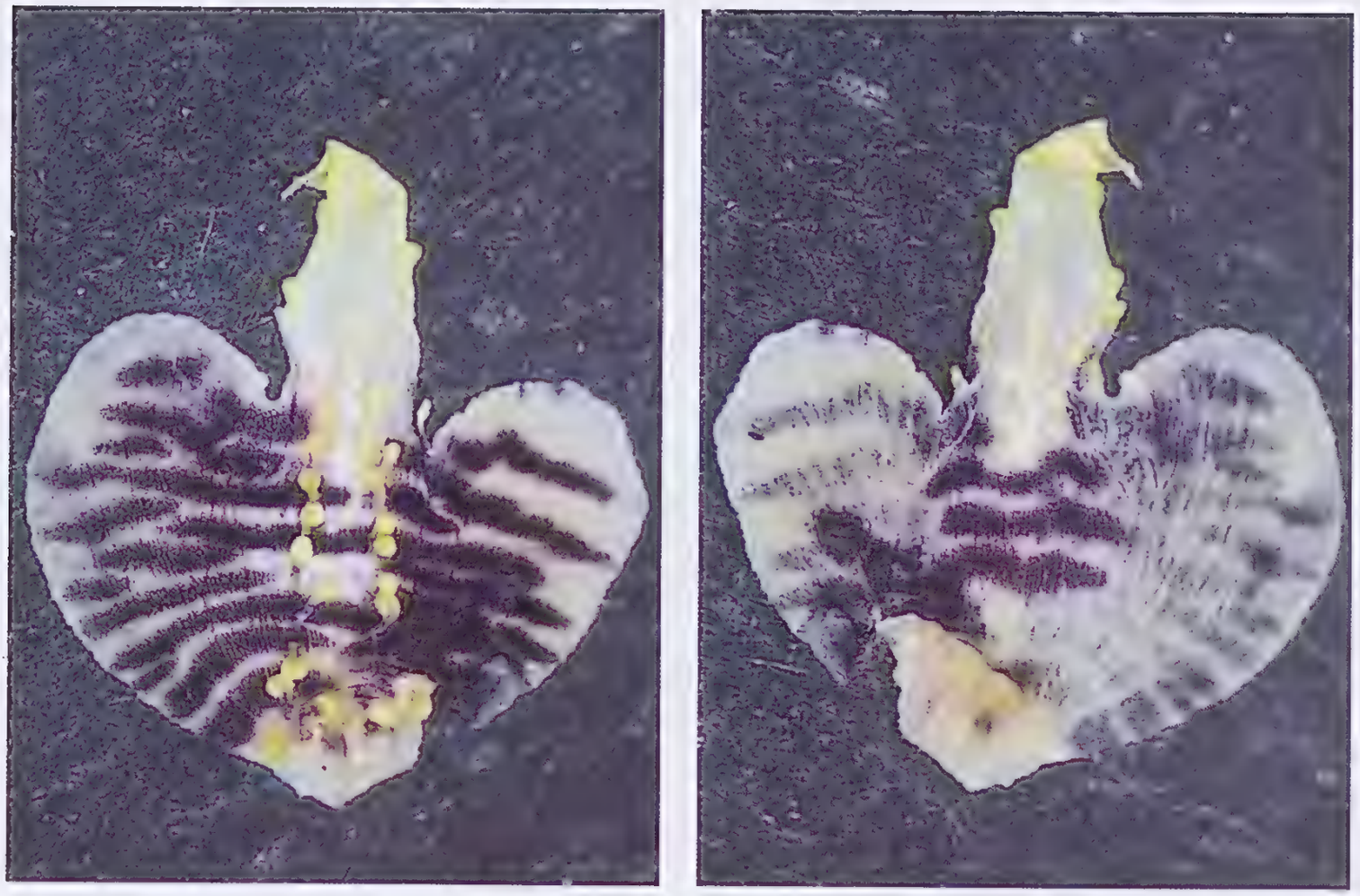

Plate 6. Dissected whole labellum of *Caladenia vulgaris* var. *nunguensis* showing distinctive uncoalesced pink-red barring and monotone (dull yellow) laminal and basal calli (upper surface on left, lower surface on right)

Tasmanian Aboriginal community.

***Vernacular name*:** The name 'bog finger-orchid' is suggested, recognising the unique habitat of the species and the vernacular name applied to the *Petalochilus* species-group (Wapstra et al. 2005+).

Discussion

The new taxon has been described as a variety of *Caladenia vulgaris* D.L.Jones. That species was described as "a very distinctive and obviously overlooked species with rather tenuous relationships to *C. carnea*", apparently "easily recognised by its tall, slender habit with proportionally long leaves (often nearly as long as the scape), and the relatively small dull pink flowers" (Jones 1991). In Tasmania, *C. vulgaris* has traditionally also been recognised by its late flowering period of late October through to December (Jones et al. 1999; Wapstra 2018) It is also often widely recognised in Tasmania by its externally dull green flowers that are reluctant to open widely, presumed to be autogomous or cleistagamous (Jones 1991). Its habitat on mainland Australia is described as "coastal heathland and scrub" but in Tasmania "more commonly in tall open eucalypt forest and eucalypt woodland, where it grows in deep litter or sometime on mossy and decaying logs" (Jones et al. 1999). *Caladenia vulgaris* is widespread in Tasmania, occurring at a range of elevations in a wide variety of habitats, predominantly eucalypt-dominated forests on fertile sites. Its range extends to the northwest, quite close to the range of the new taxon, but in typical forested and well-drained habitats such as Black Bull Scrub and Callaghans Scrub between Marrawah and Arthur River.

The newly circumscribed taxon is morphologically superficially similar to other Tasmanian species of *Caladenia*, probably part of the species-complex that includes *C. atrochila* D.L.Jones (Tasmanian endemic), *C. vulgaris* D.L.Jones and possibly *C. prolata* D.L.Jones. With these species it shares several traits including elongated ovaries, often even when in bud and at anthesis but most prominent after fertilisation, and possible self-fertilisation, based on short-lived flowers but not direct observation. *Caladenia vulgaris* var. *nunguensis* is distinguished on several morphological features (see description). The obviously tall stature, with plants growing above

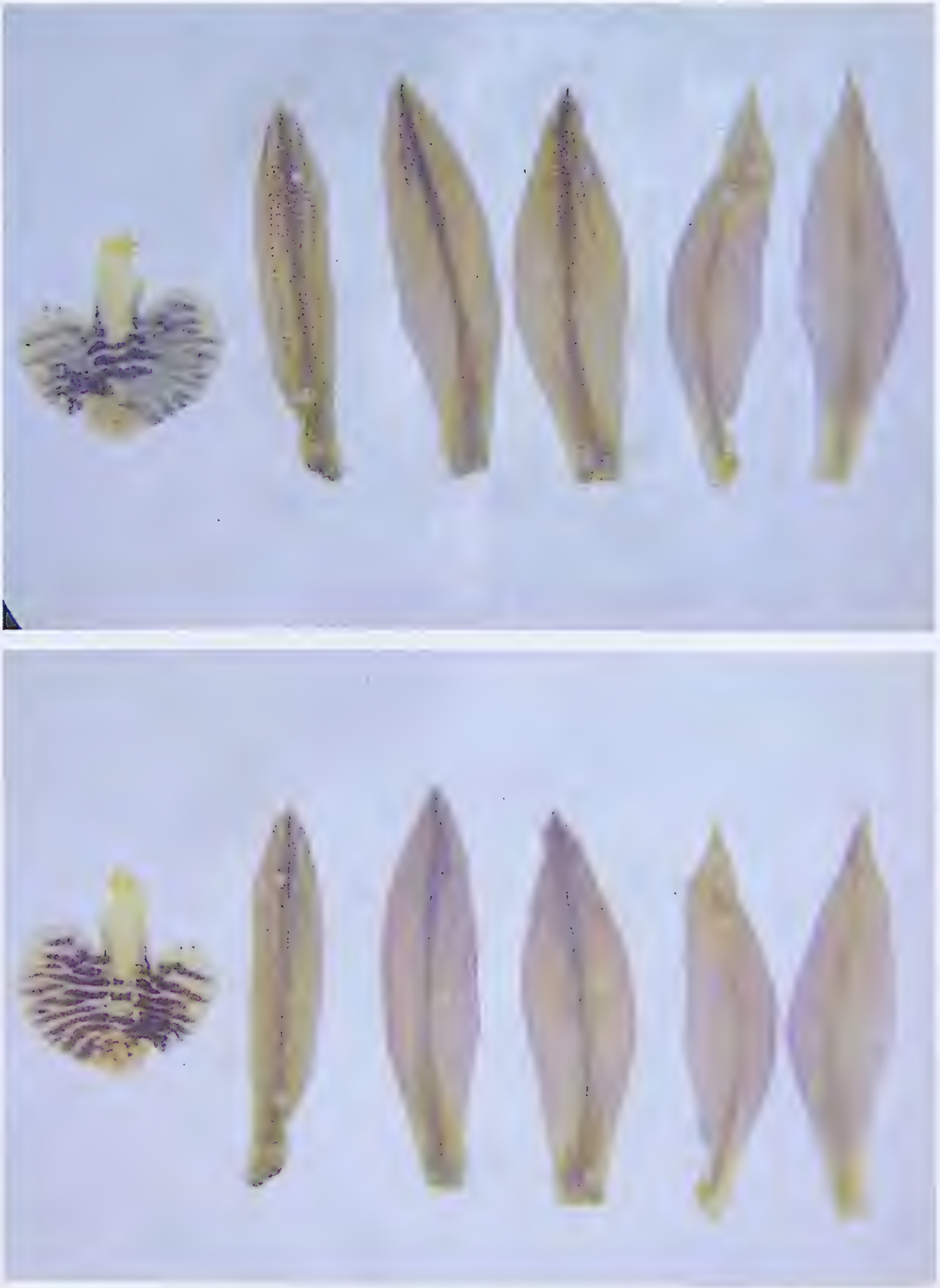

Plate 7. Dissected flower from L-R labellum, dorsal sepal, lateral sepals (x 2), petals (x 2)
(Upper = external surface; Lower = internal surface).

the surrounding grassy-sedgy undergrowth, thick hirsute scape, long sterile bracts, wide leaf to 5 mm; that is as long, or longer, than the scape, and habitat where plants grow in permanently waterlogged and shallowly inundated soils, sets this taxon apart from congeners.

Caladenia vulgaris var. *nunguensis* does not closely occur with any other *Caladenia* species, except at a general level. *Caladenia latifolia* R.Br. and *Caladenia carnea* R.Br. occur in the wider West Point area but not at the specific site supporting *C. vulgaris* var. *nunguensis*. Another Tasmanian endemic, *C. atrochila*, until recently also thought to be restricted to the narrow coastal band of the Arthur-Pieman Conservation Area, occurs in the wider area. The two taxa are superficially similar but differ in a number of key characters. *Caladenia atrochila* is a short species with a narrow leaf (1.8-3 mm wide), both the leaf and scape are distinctly hirsute, a "dark heart" flower is caused by coalescence of deep red barring on the labellum, and labellar calli that are distinctly two-toned, with the basal calli dull orange and the laminar calli dull yellow. The species grows in open habitats, usually lightly wooded and quite well-drained, although sometimes close to poorly-drained habitats. The new taxon, *C. vulgaris* var. *nunguensis*, is much taller, has a distinctly wider leaf, a "pale heart" (uncoalesced barring on labellum), and labellar calli that are uniformly dull yellow. The new taxon is superficially most similar to *C. vulgaris*, which also has a long leaf, only sometimes longer than the scape, but much narrower (2-3 mm versus 3.7-5.5 mm wide) and with monotone dull yellow labellar calli. In Tasmania, *C. vulgaris* is usually a forest species of well-drained habitat that flowers in late spring and through into summer. Mainland Australian habitat of *C. vulgaris* is described as "damp sandy heathland and coastal scrub in moisture-retentive soils" (Jones 2020), but this is only superficially similar to the habitat of *C. vulgaris* var. *nunguensis*, which is distinctively waterlogged and inundated. Adjacent flooded areas would rarely dry out completely. Within Tasmania, *C. prolata*, which is presumed to be part of the same species-complex, is apparently restricted to Flinders Island but it has distinctive swollen ovaries, even when in bud, dull white flowers and occurs in well-drained forested habitats.

The challenge with the circumscription of this new taxon is its ranking. Traditionally, most of the recent orchid taxonomy in Tasmania has circumscribed novel taxa at specific rank, with very few examples of novel taxa being described at subspecific or at varietal rank. In the case of this novel taxon, despite occurring in a highly distinctive and ostensibly unique habitat amongst this group of *Caladenia* species, the morphological differences between the taxon and the more widespread *C. vulgaris* are insufficient to warrant specific rank. A rank of subspecies or variety is preferred. In this case, given the recognised variation in habitat and morphology of *C. vulgaris* across its range, the rank of variety best acknowledges the unique habitat potentially contributing to the morphological differences. The use of varietal rank is also consistent with the senior author's personal view of the most logical placement of several formally described taxa in Tasmanian *Caladenia*, most notably the *Caladenia carnea* and *Caladenia patersonii* species-complexes, in which almost continual variation is observed between taxa, often based on geography and habitat.

This paper has assessed the conservation status of *C. vulgaris* var. *nunguensis* and we believe it qualifies for listing on both the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Listing of varieties or subspecies on the TSPA is acceptable but the listing of varieties on the EPBCA is more problematic. Walsh (2015) elevated *Leucochrysum albicans* var. *tricolor* to subsp. *tricolor* in the main "to allow whatever protection that is currently offered to it under the EPBC Act to continue, rather than to risk losing protection of a threatened taxon through a plausibly unintentional quirk of legislation". The key impetus for his paper was a "surprising determination that taxa below the rank of subspecies 'are not considered to be species for the purpose of the EPBC Act and are not eligible to be listed under section 178 of the EPBC Act' (Department of Environment 2014)". Walsh (2015) provided excellent discussion of the notions of subspecific and varietal ranks for taxa. Suffice to say, that the selection of infrataxon rank for Tasmanian taxa of vascular plant species has been as much at the whim of the author as in any other part of the world. The EPBCA defines a species (s528) as "a group of biological entities that: (a) interbreed to produce fertile offspring; or (b) possess common characteristics derived from a

Plate 8. *Caladenia vulgaris* var. *nunguensis* from near laraturunawn / Sundown Point. Photo C. Broadfield 23 Nov. 2018

Plate 9. Overview of habitat of *Caladenia vulgaris* var. *nunguensis* north of nungu / West Point. Note the near-coastal location and windswept coastal scrub. 6 Nov. 2019

Plate 10. Habitat of *Caladenia vulgaris* var. *nunguensis* north of nungu / West Point. Note the permanently waterlogged habitat that includes chimneys of burrowing crayfish. 6 Nov. 2019

Plate 12. *Caladenia vulgaris* var. *nunguensis* growing adjacent to a crayfish burrow.

Plate 13. Habitat of *Caladenia vulgaris* var. *nunguensis* near laraturunawn / Sundown Point. 6 Nov. 2019

Plate 11. Waterlogged habitat of *Caladenia vulgaris* var. *nunguensis* north of nungu / West Point showing specimen growing in situ (circled) amongst a sward of sedges and *Selaginella uliginosa* with crayfish burrows. 22 Nov. 2018

common gene pool; and includes: (c) a subspecies; and (ca) for the purposes of Part 13A—a distinct population of such biological entities; and (d) except for the purposes of Part 13A—a distinct population of such biological entities that the Minister has determined, under section 517, to be a species for the purposes of this Act". A subspecies is defined under the Act as "a geographically separate population of a species, being a population that is characterised by morphological or biological differences from other populations of that species". The implications of these definitions are that only species, subspecies or undescribed but formally recognised entities can be listed i.e. varieties are technically excluded. However, this should not dictate the selection of rank by taxonomists – the rank selected should reflect the scientific observations and comparisons. In the case of *C. vulgaris* var. *nunguensis*, our opinion is that variety remains the most valid rank.

The recognition of this new taxon adds further to the conservation significance of the coastal strip of the northwest coast of Tasmania, part of the widely recognised takayna / Tarkine. This area supports several locally endemic species of orchid (e.g. Jones et al. 1999; Collier 2017) including *Diuris lanceolata* Lindl., *Caladenia dienema* D.L.Jones, *Pterostylis rubenachii* D.L.Jones, *Prasophyllum favonium* D.L.Jones, *Prasophyllum abblittiorum* P.A.Collier, *Thelymitra aggericola* D.L.Jones, and until recently, *Caladenia atrochila*. The latter was hitherto thought to be restricted to this region but detected ca. 343 km away in the State's southeast in 2018 (Wapstra 2019), alerting to the possibility of a wider distribution of the species. However, at present, *C. vulgaris* var. *nunguensis* is considered to be a very narrow-range endemic with a very specific habitat requirement.

Acknowledgments

The landowner is thanked for permission to undertake surveys of the taxon. The Tasmania Parks & Wildlife Service are also thanked for access to reserved areas. Brian French (Environmental Consulting Options Tasmania), Malcolm & Rae

Wells, Jill & Neil Colgrave, Garth Smith and Geoff Curry assisted with extension surveys in 2018, 2019 & 2020. All material was collected under relevant scientific collecting permits issued by the Tasmanian Department of Primary Industries, Water & Environment (TFL 18172 in the name of Craig Broadfield and TFL 19120 in the names of Mark Wapstra & Brian French). Garth Smith kindly allowed use of his images of the species.

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Mark Wapstra is a consultant ecologist with a life-long interest in Tasmanian native orchids and a particular interest in the conservation management of threatened species.

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19th DENDROBIUM SPECIOSUM SPECTACULAR

& AUSTRALASIAN ORCHID SPECIES and HYBRID SHOW (2021)

Kempsey, NSW

(Ted & Winsome Walmsley and ANOS Mid North Coast Group)

EVENT CANCELLED

Dates for this event which provides a first class opportunity to see some of the best speciosums in flower as well as a wide range of other Australasian orchids and hybrids, are given below. Note the dates and plan to be there as this will be the final such show. All are welcome to exhibit and judging will be by an all ANOS panel. Monetary prizes and trophies will be awarded in a range of classes including species, hybrids and terrestrials.

Interstate entries are encouraged with a prize for the most travelled orchid.

***Dates*: Sat 4th Sept 10am to 4pm [Closed for judging b/w 11am and 12 noon this day]**
Sun 5th Sept 9am to 2pm

***Location*: Kempsey Dirt Bike Track, Alverton St., Greenhill, via Kempsey.**

***Details*: Refer to the website: www.kempseyspeciosumspectacular.com.au OR contact Ted Walmsley on (02) 6562-7150 or John Zietsch on (02) 6554-9733.**

The History of Merrellen Orchids

Text and Photos Ellen Gregory | egregory5@bigpond.com
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Ted Gregory was born in the Barrington Tops, New South Wales, on 3rd July 1930, one of four children. It was not an easy life, but Ted did well at school and at 14 years was offered a cadetship at the Gloucester newspaper. However, due to his father having an accident, he ended up working on the dairy farm with his parents. In the early 1950s the family moved to Oxley Island, New South Wales.

Barbara was born 13th February 1936 in Kempsey, NSW. Her family were dairy farmers in the Macleay district. While quite young, the family moved to Mitchells Island, on the Manning River downstream from Taree. She attended Mitchells Island Public School and then attended Taree TAFE where she completed a dressmaking and seamstress course.

Ted and Barbara were married in 1957 in Taree. We have no memories of growing orchids at Oxley Island, although we had a big vegetable patch - everything from peas to watermelons, rockmelons and broad beans (yum….and fashionable again), and Barbara had a flower bed or two, along with fruit trees. It was the era of preserves and jams. They had five children, Merril, Ellen, Ralph, Linda [deceased] and Garry [deceased].

There were occasional day trips on weekends into the bush in between milking cows, in and around Gloucester, Barrington Tops, Lansdowne Plateau and down around Bulahdelah. Just lots of photographs…..back then all taken on slide film. Ted had a wonderful knowledge of local flora and fauna, and his interest in birdlife almost matched his interest in orchids. "Merrellen" was the name of the family AIS [Australian Illawarra Shorthorns] dairy stud situated at Oxley Island & then later Glenthorne which came about in the late 1960s. The name was a combination of the names of their two daughters, Merril and Ellen.

The years 1970–78 were spent on another dairy farm in Glenthorne. The first proper orchid house was built and extended quite a few times. Our first memories of the orchid bush house came about because Ted had to raise the benches, as the pet rabbit took a liking to the new shoots on the plants. They grew mainly Australian orchids, however there were a few cymbidiums as well, which I think came from his brother-in-law Bruce.

Flooding of the Manning River was a reasonably regular occurrence, however in 1977 flooding caused the loss of crops and stock (luckily not our herd), and the stock swam for many days before the water receded. The orchids were not so lucky. A number were washed away and others were submerged for several days. Barb's garden, house and car also suffered damage and the overall trauma was devastating.

Ted had trips away with other growers to Queensland to look at plants in the bush. His mate Alwyn Flanagan had a property inland from Wauchope, New South Wales, which they would check for orchids, especially if a spot of colour caught their eye. Both were collectors of plants on fallen trees when this was allowable. I remember as a teenager stopping along the road after the Department of Main Roads had been through clearing the road, checking for plants that were on the ground. Ted was always on the lookout for quality plants that he hoped would offer better genetics for breeding.

In 1979, Ted, Barb and Garry (then aged 12 years) moved to Mount Tamborine, the other children having flown the coop. Barbara stated that she never wanted to go through another flood, so she felt comfortable moving to a higher elevation.

I remember two large removal vans, one for the household stuff and the other full to the brim with plants. They loved the climate there because they could grow a range of Australian orchids as well as more exotic genera from other countries. Merrellen Orchids became a full-time business, specialising in

Ted and Barbara Gregory April 2006

Ted Gregory in their garden April 2005

Dendrobium speciosum area August 2013

Ted Gregory talking *Dendrobium speciosum*

Ted Gregory with Alan Garrett April 2005

Dendrobium speciosum culture in shallow pan September 2010

mail-order.

Ted worked part-time as an avocado farmhand while the nursery became established. Any children that were home at the time were expected to help with the busloads of orchid club visitors and buyers. Garry was very interested in breeding and growing Australian orchids to the point of sharing his attic space with flasks of seedlings. Barb was the one who took the orders from growers, wrote out the labels, and meticulously packed and dispatched the seedlings. During their time at Mt Tamborine, Ted's excitement at venturing into breeding was only matched when a batch of seedlings flowered and reached his hopes of improving flower shape, colour, and numbers of flowers and spikes.

Ted's camera worked overtime, and he started writing articles for various magazines, most of which I typed, as his writing was very hard to read. He loved this activity the most I think - he loved to give his knowledge to others. He would without fail give a plant to any child that turned up because you just never know if they may catch the orchid bug.

Passing on information about Australian species, to keep the gene pool alive, breed with them and hopefully produce beautiful new varieties was the mainstay of his ideals...but to keep the original species around as well. Ted loved his collection of originally collected clones of orchids and never failed to tell us, and anyone who would listen, the history of each one. Ted's dedication to exhibiting native orchids led to attending not only meetings but shows as well. I remember being pulled in to help with the setup and pull-down of orchid shows. Ted was travelling south to Newcastle for meetings as well, always taking a carload of Australian orchids to show to other enthusiasts.

1994 was a terrible year. Garry was killed in a motorcycle accident, and this was devastating for Ted and Barb and the rest of the family. They made the decision to move and although it took a while to locate where they wanted to settle, they eventually decided on Nabiac, New South Wales in 1996.

From 1996–2017 a bush house and hothouse were built, plus a double garage which was to be used as a potting shed and packing area. In all the years there I don't think a plant was ever potted in the shed. They continued to be potted in the hothouse, or at the end of the veranda on the house, which was just the right height for Ted. His love of breeding orchids continued for a while, as he'd kept many young seedlings and flasks. After the move, he leaned toward growing these to flowering and watching his huge *Dendrobium speciosum* and *D. kingianum* specimens flourish. Ted and Barb also cultivated roses, camellias and many native trees in their garden to attract native birds.

Being back in his old stamping ground allowed a lot of reconnections with people, including orchid growers. Barb joined the local garden club so that she could show off her skills in growing roses and camellias. They continued to have a viable nursery open to the public, and a catalogue, to keep them comfortable in their later years. However, it all became too much for them in 2015, and a lot of downsizing had to happen. Numerous friends, contacts and dedicated orchid growers assisted in taking over the stock to ensure the plants were not neglected.

Ted and Barb were members of the Taree Orchid Society and the Wauchope Native Orchid Society. They were patrons of the Wauchope Native Orchid Society from 1989-90 and then from 1999-2017 after they moved to Nabiac. They were granted Life Membership of the society on 4th February 2013 "for being loyal supports of the Hastings River Orchid Society Inc. and good friends forever".

Ted's health declined rapidly after a bad fall, which led to hospitalization and operation for a bleed on the brain. Finally, common sense prevailed, and they relocated back to Queensland, nearer to their children and into care due to failing health for both of them. Barbara passed away on 31/3/2021.

She is survived by Ted, her husband of 65 years, children Merril, Ellen, Ralph, son-in-law David, and grandchildren Lauren and Caitlyn.

Ellen Gregory and Merril Newberry are Ted and Barbara's daughters.

The Orchid Breeding Program of Merrellen Orchids

Text and Photos Peter Adams and Sheryl Lawson | pbadams45@gmail.com

'Specialising in cool growing natives and native hybrid orchids'

This account is based on our personal interactions with Ted and Barbara over many years as well as the Merrellen catalogues.

Merrellen Orchids began after Ted and Barbara Gregory moved to Mt. Tamborine, Queensland, where the cooler conditions were very suitable for cool growing Australian dendrobiums. In 1977 they reportedly selfed a *D. kingianum* plant said to have been collected from Gloucester, New South Wales. Some of these seedlings, for example, 'Merrellen No. 1' and 'Merrellen No. 2', formed the basis of their initial *D. kingianum* breeding stock. The original plant used for selfing was washed away by a flood when they lived in the Taree area.

The collection was expanded by the acquisition of plants from other enthusiasts in the area, including the Hastings Kingianum Growers Group and Bill and Jean Cannons of Wayside Nursery (Adams and Lawson 1995) before embarking on their own *D. kingianum* breeding program. They were strongly influenced by the Cannons in the selection and the process of breeding species and hybrids. Ted and Barbara were notable for their outstanding cultural skills, establishing striking specimen-sized plants which included early on *D. kingianum* 'Roy' AD/AOC, *D. kingianum* 'Corrigans Red' and *D. kingianum* 'Tungsted's Pink' (correct spelling later established to be 'Tunstead's Pink' after Mr John Tunstead who collected the plant). These plants were grown in large shallow terracotta pans, were full of canes without leafless ones, and had a dense cloud of racemes above the foliage, in the full range of *Dendrocoryne* colours (see photos). Success in growing and exhibiting was a result of both cultural technique and suitable growing areas, at elevated Mt. Tamborine, in southern Queensland and at Nabiac on the coastal strip in northern NSW. *Dendrobium kingianum*, a Merrellen Orchids favourite species, grows and flowers best in areas within and close to the natural distribution. In other areas such as southern NSW and Victoria, and warmer coastal areas of southern Queensland, leaf drop on mature canes and lesser flowering reduce the likelihood of developing optimal specimen plants.

Merrellen Orchids Australian orchid breeding started with species and primary hybrids, and a clear and positive vision that very attractive and floriferous results would follow. Throughout their program, and in their last years of production, their vision did not change. Remaking hybrids and breeding *D. kingianum* using advanced parents were consistent features of their catalogues. There were also ventures into new *Dendrocoryne* hybrids and occasional intersectional *Dendrobium* hybrids. Where others had made and registered successful cool-growing hybrids, Ted and Barbara repeated the crosses using carefully selected parents from their stock. *Dendrobium kingianum* and *D. speciosum* were two species frequently used for line breeding and hybrids throughout the whole period of breeding. Most of the plants used were from their collection, with some addition of purple-flowered *D. kingianum* seedlings from the Hastings Kingianum Growers Group.

The nursery produced a large number of Australian orchid seedlings that were distributed widely in eastern Australia. Although Ted and Barbara were keen for feedback about the results of flowering from their customers, this rarely happened, which is frustrating for breeders. The Gregorys were superb orchid growers and had broader interests in exotic orchids and other exotic plants and garden plants, particularly camellias. Their specimen plants of Australian orchids, *D. kingianum* and *D. speciosum* in particular, were outstanding and inspired a generation of orchid growers. The seventh Australian Orchid Council Conference and Show was held in Brisbane in 1983. Ted and Barbara

Gregory were awarded First and Second Prize in the *Dendrobium kingianum* section. Their properties at Taree in New South Wales, Mt. Tamborine, and their retirement property at Nabiac, were carefully chosen for optimum growth of cool-growing orchids and general garden plants.

Ted and Barbara deflasked and sold seedlings primarily. Each seedling ordered was separately and neatly wrapped for posting by Barbara, with a label in her distinct handwriting.

In the No. 1 Catalogue Ted's introductory comment was "Well, here it is, warts and all, our very first price list." It contained Australian orchid species and primary and secondary hybrids. *Dendrobium* Suffusum, *D.* Delicatum, *D.* Bardo Rose, *D.* Suffusum x Bardo Rose (*D.* Blushing Rose, made by the Cannons of Wayside Nursery, and registered by David Cannon in 1982), *D.* Peewee x *D. tetragonum*, *D.* Sunglow, *D.* King Falcon and *D.* Allyn Star. Paphiopedilums, cymbidiums and cattleyas were also represented.

Their first catalogue under the name Merrellen Orchids was released on 1st June 1983 for 1983–4. Ted wrote, "the species is where my main interest lies, and where I think we will see the greatest improvements over the next few years". The catalogue also mentions the goal of remaking hybrids such as *Dendrobium* Delicatum and *D.* Bardo Rose using better parents. They aimed to "mostly keep about 20 of a cross to flower". Some years later the number kept on was down to four plants (pers. comm.) The catalogue listed several primary hybrids – *D.* Gracillimum, *D.* Ellen, *D.* Delicatum, *D.* Suffusum, and *D.* Ella Victoria Leaney. There were also second and third-generation hybrids such as *D.* Peewee x *D. tetragonum* (later registered as *D.* Rosella by W and J Cannons of Wayside Nursery in 1983), *Dendrocoryne* hybrids, and crosses of *D. kingianum*, as well as aerials of sought-after natural *D. kingianum* for $5 each. There were also a small number of *Sarcochilus* hybrids. Non-Australian orchids on the list included cattleyas, paphiopedilums and cymbidiums.

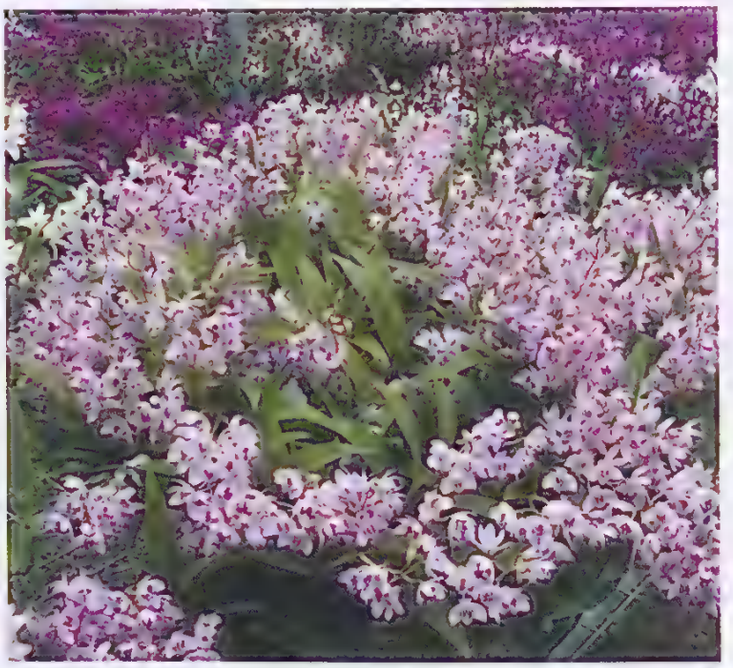
The second catalogue, 1984–5, offered a similar range of plants, with more *D.* Delicatum crosses and inter-varietal crosses of *D. bigibbum*. The Orchid Species Society of Victoria purchased seedlings of *D. kingianum* 'Middle Brother' x 'Tungsted's Pink' for their members, but few of these are still in collections. The 1985–6 catalogue notably offered seedlings of *Sarco.* Melba, *Sarco.* Weinhart and *Sartylis* 'Blue Knob'. The 1986–7 catalogue introduced a coloured front page of their flowering results. The 1987–8 catalogue was similar, with several *D. kingianum* seedlings using 'Tungsted's Pink' as a parent.

In the catalogue for 1988–9, several *D. speciosum* crosses were advertised, including *D. speciosum* var. *curvicaule* and var. *grandiflorum*, as well as hybrids in sect. *Dendrocoryne*. The 1989–90 catalogue offered seedlings which included *S. ceciliae*, *S. fitzgeraldii*, and hybrids made with *S. fitzgeraldii*.

In 1990–91 the early linebreeding of *D. kingianum* was emerging, using 'Merrellen', 'Tungsted's Pink' and some purple-coloured seedlings. The look of the catalogue was updated in 1992–2 with increased colour of the front page and a second full-colour page. The front page consisted of photographs of *D. kingianum*, *D. speciosum* and *Dendrobium* hybrids. There was a section listing Sarcanthinae hybrids and *Dendrobium* hybrids. *Dendrobium kingianum* breeding included more purple ('red') breeding including 'Karl Marx' x 'Red No. 3' and '66' x 'Redwing' ('Redwing' is 'Karl Marx' x '66'), and 'Karl Marx' x 'Jazzy' ('Jazzy' is 'Karl Marx' x '60'). *Dendrobium* Peach Glow (*D.* Golden Fleck x *D.* Hastings) was also listed. The original cross was made by Wayside Nursery and registered by D. Cannon in 1981.

The 1992–3 catalogue stated that there were "fewer new offerings because of a disastrous pod season last year" and Ted filled the vacant space with an article on various dendrobiums in the catalogue and included an apology for a mislabel – the listing N42 Wonga had turned out to be *D. speciosum* var. *curvicaule* (this type of error rarely occurred). The catalogue featured *D.* Our Native (*D. johannis* x *D. speciosum*), an intersectional hybrid registered by Kevin McFarlane in 1997. Ted and Barbara had previously made hybrids using *D.* Manning (*D. speciosum* x *D.* Willowie Gold), which was registered by Merrellen in 1987. They also offered seedlings of *D.* Willowie Gold (*D. discolor* x D. *tetragonum)*, registered by Limberlost in 1970. The list included a remake of *D.* Eureka (a primary hybrid of *D. fleckeri* and *D.*

Bench of *Dendrobium kingianum*



Dendrobium kingianum September 2009

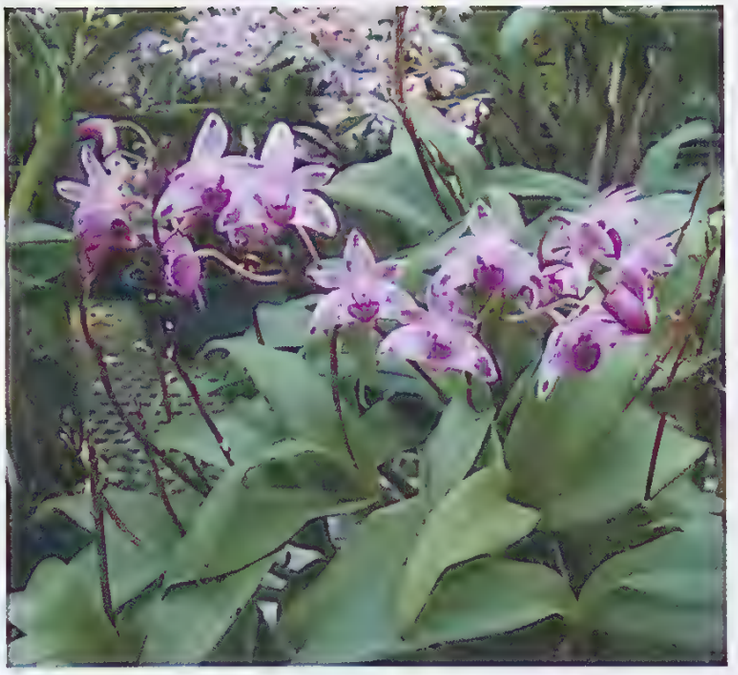
Dendrobium speciosum September 2008

Dendrobium x *delicatum* September 2009

Dendrobium x *delicatum* September 2009

Dendrobium kingianum purple seedling September 2009

Dendrobium kingianum 'Rojo'



Dendrobium kingianum September 2009

Dendrobium kingianum with shallow pot culture

Sarcochilus hartmannii, southern form September 2009

Dendrobium kingianum September 2009

Dendrobium kingianum specimens

Dendrobium Hastings

jonesii), *D.* Manning x *D.* Hastings (unregistered), *D.* Manning x *D.* Sunglow (unregistered), *D.* Jesmond Gem, *D. speciosum* var. *capricornicum* x *D.* Yondi 'Pink Delight', and remakes of *D.* Hastings.

Notable crosses in the 1993–4 catalogue included the hybrid *D.* Yondi using a red *D. kingianum* seedling, and *D. gracilicaule* x self. There were selfings of *D. speciosum* var. *curvicaule*, more 'red' *D. kingianum* seedlings and seedling crosses of *D. kingianum* 'Tamborine'. Ted Gregory's *Guide to Growing Native Orchids*, a small paperback of 32 pages, was also available for $7 including postage within Australia.

Ted continued to make seedlings of *D.* Bardo Rose, *D.* Yondi (using a favourite *D. kingianum* 'Ruby'), *D.* Gracillum, *D. jonesii* and *D.* Suffusum. He also offered *S. fitzgeraldii*, *S.* Melba and *S.* Fitzhart and varietal and inter-varietal crosses of *D. speciosum*. *Dendrobium kingianum* 'Ruby' x 'Grace B' had produced floriferous, purple-flowered offspring. The catalogue also had *D. kingianum* 'Handout' x 'Black Gold' and remakes of *D.* Hilda Poxon and *D.* Delicatum.

The 1995–6 catalogue offered divisions of *D. kingianum* 'Linda' for $18, with a limit of one per customer. There were new *Sarco. hirticalcar* hybrids, *Sarco. ceciliae*, *Sarco.* Fitzhart, *Sarco.* Judith, *Sarco.* First Light and *Sarco.* Cherie. There was a notable trend of remaking hybrids after other breeders had registered them and had shown successes.

In 1996–7 the use of colour in the catalogue expanded further. *D. bigibbum* var. *compactum* was again offered. There were *D. kingianum* seedlings using white, pink and purple-coloured plants with combinations of quality Gregory seedlings as parents. The list included *D. fleckeri* x self, *D.* Gillian Leaney, *D.* Telekon (*D.* Hilda Poxon x *D. kingianum*), *D.* Aussie Quest, *D.* King Wong, *D. kingianum* 'Red' x 'Rojo' (breeding for purple flowers) and *D. speciosum* var. *curvicaule* x self.

Over the years at Mt. Tamborine, there was a steady flow of visitors during the flowering season, and they came as individuals, or in crowded cars and buses from all the eastern states. People rarely left without purchasing boxes of seedlings, even though the main emphasis of the nursery was mail-order. There was a lot of arm-twisting to purchase divisions of quality established plants as well as newly-flowered seedlings. Many stopped to inspect the beautifully manicured garden as well. A cup of tea and a yarn with Ted and Barb was always on the agenda, and for closer friends, photographs or a slide show of recent orchid flowering. Although the commercial and catalogue phase was completed before Nabiac, the same enthusiasm to share information and results with visitors continued, with tours of an orchid house full of the most outstanding Merrellen productions in the spring and early summer.

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Plectorrhiza tridentata (Lindl.) Dockrill and Some Hybrids

Text by Jeanne Dunn | Jeanne.dunn@bigpond.com

Summary

Plectorrhiza tridentata was first described by John Lindley in 1838. It is variable in plant form and flower colour and is distributed from Cape York to eastern Victoria and is a plant of wet humid areas, mainly rainforest. Cultivation requires replication of these conditions. Some hybrids have been made, including the intergeneric *Plectochilus*. I am extending the number of hybrids and crossing colour forms of the species to develop new colours and colour combinations.

Introduction

The genus *Plectorrhiza* is classified in Tribe Vandeae, subtribe Aeridinae, which contains the Australian genera previously known as Sarcanthinae. It is a small epiphyte with colourful, fragrant flowers and requires particular growing conditions. I have been interested in observing the variability of the species in its natural habitat and breeding the species as well as hybridising with it and other Australian Aeridinae genera.

Plectorrhiza tridentata is also known as the common tangle orchid. The 'tangle' reference is quite apt as it describes the typically untidy growth habit. It is distributed along the east coast of Australia from the Annan River in north Queensland down south to eastern Victoria. The distribution is far from continuous, with intervening dry habitat, such as in central Queensland, where conditions are unsuitable for growth.

History

Plectorrhiza tridentata was first described as *Cleistostoma tridentatum* by John Lindley in 1838. Since then there have been several generic and specific names used by well-known orchidologists, including von Mueller, Rupp, and Reichenbach, indicating that it was difficult to decide on its relationships in the 19th and early 20th C. Most of the genera in the list of synonyms were south-east Asian, indicating a superficial similarity with plants of this region.

Synonyms

Cleisostoma tridentatum (Lindl.) 1838

Cleisostoma cornutum Rupp 1935

Saccolabium calcaratum F. Mull. 1859

Sarcanthus tridentatus (Lindl.) Rupp 1941, 1944

Sarcochilus tridentatus (Lindl.) Rchb.f. 1863

Thrixspermum tridentatum (Lindl.) Rchb.f. 1868

The Sarcanthinae underwent a significant study in 1967 by Alick Dockrill, who formally established the genus *Plectorrhiza* and regarded the genus as comprising three species; *Plrhz. tridentata, Plrhz. brevilabris* and *Plrhz. erecta*. More recent work (Renner 2019) has transferred two other species into the genus: *Plrhz. purpurata* (formerly *Schistotylus purpuratus*) and *Plrhz. beckleri* (formerly *Papillilabium beckleri*). It has long been recognised that these species were very similar morphologically to *Plectorrhiza*. All five *Plectorrhiza* are Australian endemics, although *Plrhz. erecta* is known only from Lord Howe Island.

Description (based on Dockrill 1992)

The plants are usually hanging by roots from tree branches and twigs. The stems are up to 30 cm long, generally shorter, bearing 20 mid to dark-green leaves 4–10 cm long x 0.8–1.6 cm wide. There are 3–15 flowers, 3.5–4 mm diam., intensely fragrant, and with tepals that have combinations of brown, green and purple. The labellum, with both the deep spur and disc, is at right angles to the column and parallel to the ovary, which is 6–7 mm long; the

Plectochilus Kilgra 'Purple KW'

Plectochilus Kilgra 'Striped Purple'

Plectochilus Kilgra 'Western'

Plectochilus Kilgra 'Yellow SH"

Plectochilus Kilgra 'Green'

Plectochilus Kilgra 'Small Pink'

Plectorrhiza tridentata 'Apple Green'

Plectorrhiza purpuratus

Plectorrhiza tridentata 'Narrow Petals'

Plectorrhiza brevilabris 'Green'

Plectorrhiza tridentata 'Brown Dots'

Mounted plants

spur is 1.5–3 mm long. The pollinia are about 1 mm long, compressed, cylindrical or ovoid, and the stipe (stalk) is 2 mm long.

The roots can be very untidy but quite strong. Plants often hanging off small branches held by only one root. The roots can be very long and tangled and suspended in the air. Very large clumps can be formed, and it is exciting to see a very old plant covered with hundreds of flowers. Seed pods can sometimes still be intact a year later when the plant is in flower the next year. The species name reflects the fact that the labellum has three lobes and the 'spur', a projection extending from beneath the labellum, can vary in size and colour.

There are no pollinators known. Renner (2021) has proposed a pollination mechanism based on detailed observation of the flower structure. Seed pods are often found with firm pollinia unsuitable for self-pollination, so there must be a pollinating agent.

Habitat

Plectorrhiza tridentata is a plant of moist, fairly humid rainforest, usually along creeks and rivers and in swampy areas. I have seen them in the bush in Victoria and New South Wales. They like good airflow. In the locations they grow in ferns and mosses are abundant. They like moisture! Unfortunately for them, they grow on tiny tree twigs that can fall to the ground when there is a strong wind or heavy rainfall, where the plants are usually dead or desiccating. Fire also becomes a problem. Just last year in East Gippsland, one side of the road where they grow was destroyed by fires. It grows prolifically in some areas of East Gippsland and is adapted to the cooler conditions, flowering and generating seedlings. The specimen plants may be very large and form clumps, with a variety of colours from brown, red, chocolate, to a dark and lighter green. After fires, areas not affected may have many new seedlings on bushes and trees.

These plants vary in growth habit, size of leaves and flowers, flower colour and time of flowering.

They usually flower between September to February but this can vary a lot depending on weather conditions and where they are growing.

Growing *Plectorrhiza tridentata*

I have grown and loved these tiny orchids for about 15 years. I find them fascinating, and the best part is that they like to grow in my orchid house. The general principle is that when you see orchids growing in the wild and copy their conditions, you should have no trouble growing them.

The orchid house in which I culture the plants is 15x5m and oriented more-or-less east-west. It has a 50% opal-translucent poly-carbonate roof. This is a recent replacement of earlier fibre-glass sheeting which was heavily crazed from hail damage, and which had become too opaque. Underneath the sheeting is a layer of 70% shade cloth. This is especially needed in the summer but remains all year round. To maximize airflow, I generally open the two end-doors daily but then need to watch out for any intruding butterflies. Occasionally small birds need shooing out as they seem to enter more readily than exit.

I keep the house very humid, which is a requirement for these orchids to grow. The floor is covered with small grade scoria rock which I water on hot days to maximize humidity; ferns, 'baby tears' and small frogs(!) grow abundantly there. I also have containers of water beneath the shelves.

The plants do not require many fertilizers but get some cow manure tea and any other fertilizer I use in the orchid house. The plants do not seem to succumb to attacks of insects or diseases. I do not use insecticides or sprays in my orchid house but if I have any insect or problems with any orchids, I take them outside and spray them, then bring them back in 24 hours. I do not want to poison the frogs!

The plants of *P. tridentata* are grown on the south side because hanging plants of other genera on the northern side then assists to give extra shading. Most of the young plants are attached to wooden mounts. I have variously used red-cedar, fence-palings, cork and even pieces of ironbark. For plants that will be subsequently remounted to larger supports, the smoothness of the cedar and palings makes transfer without damaging young roots somewhat easier. The lightweight of the red cedar is a side benefit, especially when hanging hundreds of plants. The mounts are mostly hung off the edges of the benches.

Hybridization

I was prompted to attempt hybridization with *P. tridentata* after a fellow grower showed me a specimen plant that was more strongly coloured than usual. This eventually led to me doing 'selfings' of *P. tridentata* 'Apple Green' and also of 'Purple' so that they could be spread around to interested growers. Unfortunately, not all of them turn out to be purple or green. They vary in many colours – mainly browns and dark greens - and I am guessing here approximately 1 in 6 turns out to be the same as the original plant in flower colour and size. There are some of these in circulation.

The main intergeneric hybridization used one of my *Sarcochilus falcatus* and *P. tridentata* 'Purple'. The other hybrid I made was *Sarcochilus falcatus* 'Bushy' x *P. tridentata* 'Apple Green', which is *Plectochilus Kilgra.*

The other intergeneric hybrids that I have made more recently are:

Sarcochilus ((George Colthup x Velvet) x S. Fizzy Dove 'Salmon')) X *P. tridentata* 'Red'

Sarcochilus Judith X *P. tridentata* 'Apple Green'

Sarcochilus (Magic 'Stars & Bars' x *S. hartmannii* 'RS') x *P. tridentata* 'Chocolate'

Sarcochilus Burgundy on Ice x *P. tridentata* 'Large Brown'

Sarcochilus falcatus X *P. tridentata* 'Purple'

These will flower this year, so I am very interested to see which of the parents is dominant.

There is one registered *Plectorrhiza* hybrid, *Plrhz.* Olga. There are 23 registered *Plectochilus* intergeneric hybrids (*Plectorrhiza* x *Sarcochilus*), as well as several other intergeneric hybrids. These include *Peristorrhiza* Surreal (*Peristeranthus hillii* x *Plectochilus* Olga), *Russellara* Lucy-R (*Rhinochilus* Orange Stars x *Plrhz. tridentata*) and *Malcolmcampbellara* Emarcy Magenta (*Sarcomoanthus* Emarcy Gem x *Plrhz. tridentata*).

ANOS Awards

There is one quality award for *Plrzh. tridentata* 'Chocolate Drops' HCC/ANOS 1996 (NSW). Three other named plants received cultural awards (ACC/ANOS), being 'Lynwood' and 'Bundacol' in 2017, and 'Margaret' in 2008.

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Dockrill AW 1967 *Australasian Sarcanthinae*. The Australasian Native Orchid Society.

Dockrill AW 1992 *Australian Indigenous Orchids*. Surrey Beatty and Sons.

Renner AM 2019 A nomenclatural history for *Plectorrhiza purpurata* (Orchidaceae). *Telopea* 22: 157-159.

Renner AM 2020 Fool me once: do *Plectorrhiza* flowers deceive then reward pollinators? *Orchadian* 20: 22-26.

Acknowledgements

Many thanks to Peter Adams who gave his support and tutoring when reviewing the manuscript and adding taxonomic material. Thanks to Carol Barnett for her photograph of *Plrhz.* Kilgra 'Purple', and many thanks to Ian Dunn for the other photographs. Many thanks to Bruce Dennett from the Bairnsdale and Sale Orchid Club who gave me the original plant several years ago.

Jeanne Dunn is a horticultural graduate of Burnley, University of Melbourne and a keen grower and breeder of Aeridinae and Dendrobium *sect.* Rhizobium.

Dendrobium Hybrids – The Australasian Blues

Text and photos Roslyn Capell | capell666@ozemail.com.au

The colour of some *Dendrobium* sect. *Spatulata* and *Spatulata/Phalaenanthe* hybrids has, to my eye, a decidedly blue appearance, and this includes several Australasian native *Dendrobium* hybrids. It is violet-blue rather than sky-blue and often occurs in combination with purples and other colours in the same flower, but the overall impression is a distinctive "blue" which is immediately recognisable when one of these plants is seen on the show bench next to warm-coloured flowers in pinks and red-purples. Examination of the award descriptions for awarded examples of hybrids in this category indicates that others perceive the colour similarly. The AOC awards record RHS colour chart selections in the purple, purple-violet, violet and violet-blue range, none crossing over into the warmer red purples. The AOS award descriptions, unfettered by the RHS colour chart, venture into indigo, grape violet and lavender.

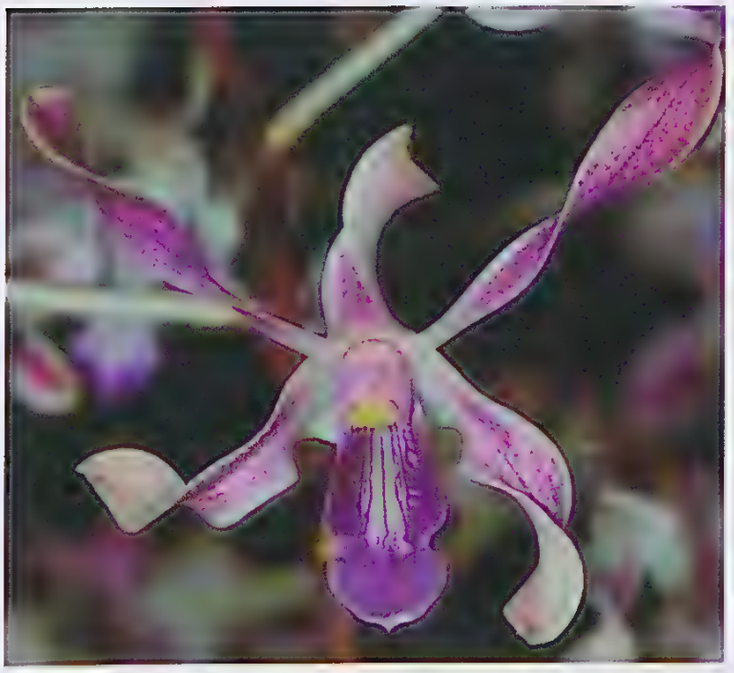
A number of the same species frequently appear in the background of these hybrids. The core four - *Dendrobium lasianthera*, *Dendrobium gouldii*, *Dendrobium nindii* and *Dendrobium lineale* - are all known for their violet colour or they have well-known "blue" forms (e.g. *D. lineale* 'Kui Blue', *D. gouldii* 'Blue', and *D. lasianthera* 'Sepik Blue'). In *Orchids of Papua New Guinea* (Millar 1999), Andreé Millar gave a detailed description of the colour of the flowers of *D. lineale* 'Kui Blue' and said the colour is 'definitely blue', albeit 'with an overall pinkish sheen', and the photograph in the book supports that description. Both *Dendrobium tangerinum* and *Dendrobium canaliculatum* can have blue-purple colouring in the labellum and many hybrids which have blue labellums and blue markings in the tepals

Table 1. *Dendrobium* Hybrids with Species Contributions.

Dendrobium Hybrid	Species Background Composition %											
	bps	*c*	*co*	*d*	*g*	*h*	*la*	*li*	*n*	*s*	*ta*	*to*
Adrian Lonne		50				25	25					
Alice's Rusty		25		12.5		37.5	12.5	6.3	6.3			
Blue Sparkle	6.3				50			6.3	37.5			
Blue Sparkle x *gouldii*	3.1				75			3.1	18.8			
Blue Twinkle	9.35	50		6.25	12.5			15.6	6.3			
Bundy Blue	3.1		50	18.8	12.5		3.1		12.5			
Cherrylee's Joy		25						75				
Genting Fragrance		37.5					50	6.3				6.3
Impact Twister	3.1				25		50	3.1	18.8			
Impact Twister x Adrian Lonne	1.6	25			12.5	12.5	37.5	1.6	9.4			
Neil Crees	3.1			12.5	25	25		9.4	25			
Tangie Angie	14.1							6.3		1.6	75	3.1

Legends: *bps = D. bigibbum, syn. D. phalaenopsis, syn. D. schroederianum; c = canaliculatum; co = cochliodes; d = discolor; g = gouldii; h = helix; la = lasianthera; li = lineale/veratrifolium ; n = nindii ; s = stratiotes; ta = tangerinum ; to = tokai*

D. Blue Sparkle (*D.* Blue Chip x *D. gouldii*)



D. Alice's Rusty (*D.* Adrian Lonne x *D.* Island Fantasy)

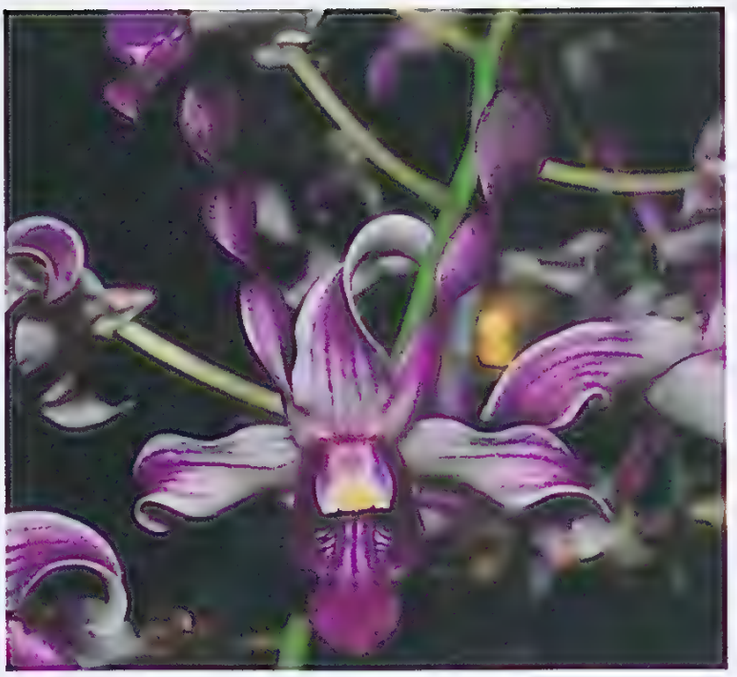
D. Impact Twister x *D.* Adrian Lonne

D. Blue Sparkle x *D. gouldii* 'Blue'

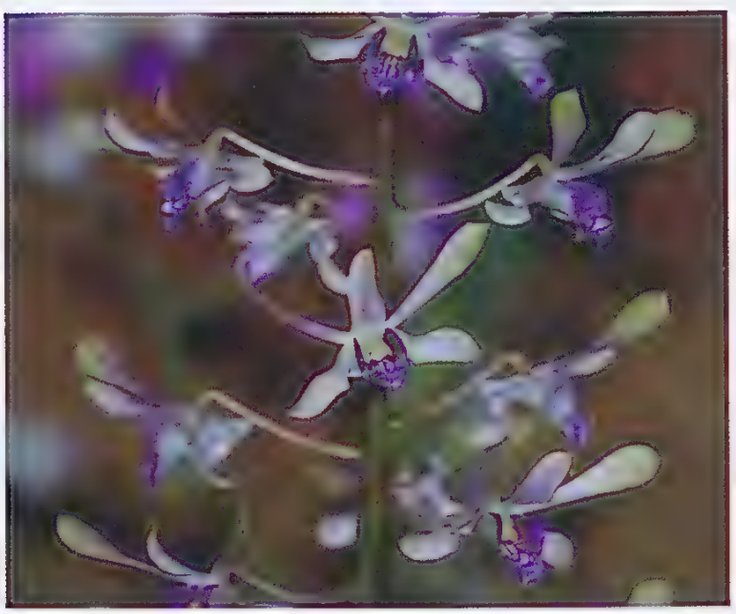
D. Adrian Lonne 'Lyndal' HCC/ANOS 2006 (Qld); AM/AOC 2005 (NSW) (*D.* Dandy Dame x *D. canaliculatum*)

D. Blue Twinkle (*D.* Betty Goto x *D. canaliculatum)*

D. Bundy Blue (*D.* Kuranda Blue x *D. cochliodes*)



D. Impact Twister (*D.* Blue Sparkle x *D. lasianthera*)



D. Cherrylee's Joy 'Bree' HCC/AOC 1999 (NSW)
(*D.* Gloucester Charm x *D. lineale*)

D. Neil Crees (*D.* Blue Sparkle x *D.* Island Fantasy)

D. Genting Fragrance (*D.* Little Lulu x *D. lasianthera*)

D. Tangie Angie (*D.* Angela x *D. tangerinum*)

have these species in their background. Several other Australian and Australasian section *Spatulata* species have some degree of violet colouring too, either in their labellum or in the veining on the tepals, or sometimes even on the rachis. Lavender forms of *Dendrobium discolor* have been reported from the northern and southern extremes of its range in Australia.

Another notable contributor of blue colouring is the exotic species *Dendrobium taurinum* which is endemic to the Philippines, outside the ANOS boundary. Its presence precludes any hybrids in which that species contributes even a small percentage of genes from being ANOS-eligible. Therefore *D.* Makariki Blue (14.1% *D. taurinum*), *D.* Masako Taki (6.3% *D. taurinum*), and *D.* Blue Mountain (Syn. *D.* Blue Planet - 3.9% *D. taurinum*), for example, are ineligible exotics for ANOS purposes.

The most strikingly blue are the flowers that are just blue and white, such as the examples of *D.* Blue Sparkle and its progeny *D.* Impact Twister (*D.* Blue Sparkle x *D. lasianthera*) pictured.

Table 1 sets out the percentage of each species in the background of each of the photographed hybrids. Each contains a significant amount of one or more of the core four species except for *D.* Tangie Angie, which contains only 6.3% of *D. lineale*. The main species is *D. tangerinum* but the combination of genes in the photographed plant has produced a lavender-blue flower.

Whether you see them as blue, purple or mauve or something else, these colours add to the wide range of glorious hues available to enjoy in this type of hybrid.

References

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Roslyn Capell is an ANOS and AOC judge in New South Wales.

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Dendrobium cucumerinum MacLeay ex. Lindl. – Habitat and Cultural Observations

Text by Owen Sengstock | owen_s7@hotmail.com

Summary

Since I first observed *Dendrobium cucumerinum* in the wild in southeast Queensland, I have had an interest in this peculiar species. As an avid amateur grower and bushwalker, I have sought to gain a better understanding of this species through field observation of its habitat and translate these learnings into bush house culture. These notes are representative of my personal experience.

Introduction (Editor)

Dendrobium cucumerinum is a fleshy-leafed member of *Dendrobium* section *Rhizobium.* The common name 'cucumber orchid' arises from the unusual leaves that are shaped like small gherkins, with projections or tubercles arising along their length. It forms dense mats of many branches, mainly on trees east of the Great Dividing Range from the Burragorong Valley in central Eastern New South Wales to eastern Queensland, probably as far north as the Bunyah Mountains (Dockrill 1992). It flowers from November to February and has short inflorescences that bear 2–20 flowers, which may be non-resupinate or oriented in different directions. The flowers are cream to greenish-white with 3–5 reddish-purple stripes in the proximal half, sometimes with twisted and recurved segments. The labellum is white with purple longitudinal stripes and the margins of the midlobe are deeply undulating. It has some similarities to *D. linguiforme,* but the leaves are uniquely shaped and not tongue-like. The species is scattered in its distribution and may be locally common, especially on river she-oaks in undisturbed areas. It is grown in some collections as a mounted plant and requires moist, humid and partly shaded conditions. Owen describes the application of habitat observations to growing the species successfully in the Brisbane, Queensland area.

Field Observations

I have observed *D. cucumerinum* across the ranges between the Blue Mountains, west of Sydney through to southeast Queensland up to the Jimna / Kilcoy district. As a resident of Brisbane in Queensland, most of my field trips have ranged between northern New South Wales and the Kilcoy district.

Dendrobium cucumerinum is typically located on the watercourses of the western side of the Great Dividing Range. This species is locally common in areas of suitable habitat. It is more prevalent where the conditions provide higher humidity. This is typically associated with moderate altitudes, dense undergrowth of grasses, reeds and ferns and permanent water holes. These localities can experience larger diurnal temperature variations than similar areas on the eastern side of the Great Dividing Range. During the cooler nights following warm days, the air over the watercourses often becomes saturated, leading to localised dew. When I have visited these areas in very dry periods, the colonies have often looked surprising healthy, suggesting that these mists sustain them through these low rainfall periods.

The favoured host is *Casuarina cunninghamiana*, the river she-oak. I have seen occasions where it has grown on *Eucalyptus* and large rocks, however, these instances have always been near major colonies located on *C. cunninghamiana* trees. It typically grows on the trees closest to the watercourse. The bark is rough and can become a bit spongy when wet. Roots of *D. cucumerinum* often burrow in below the surface of the bark seeking moisture and protection. The bark will dry quickly when the humidity drops.

In most cases, I have observed this species growing on the vertical trunks or the underside of branches of the host. Seldom have I seen it growing on the top side of branches. In many cases, I have seen evidence of a plant commence growth on the top side of a branch and grow downwards and then along the underside of the branch. Good airflow is present in this habitat, and other orchid species including *D. speciosum*, *D. linguiforme* and *D. gracilicaule* can sometimes be observed.

Cultural Notes

Many years ago, I purchased seedlings of *D. cucumerinum* from a native nursery and had many cultural failures. Through experience and my field learnings, I have been able to create an environment in my bush house in Brisbane which is conducive to the culture of this species.

Typical riverine habitat for *Dendrobium cucumerinum* with host trees *Casuarina cunninghamiana*. Photo O. Sengstock

Dendrobium cucumerinum on mount secured with fishing line. Photo O. Sengstock

Dendrobium cucumerinum near Warwick, Queensland. Photo D. James

Shadehouse with mounted plants of *Dendrobium cucumerinum* hanging above benches. Photo O. Sengstock

As with many other Australian epiphytic orchids, providing damp conditions is a recipe for disaster. Light daily watering or misting plus a small amount of *Sphagnum* moss proved to be excessive and led to rot, which swiftly killed the entire plant. Similarly, hanging a plant under a top bench of small plants (50–80mm tubes) resulted in dripping which led to the onset of localised rot where the dripping was focussed. Once rot takes hold, it often moves quickly to kill the entire plant.

Success was achieved by growing plants hanging in a high position above the top bench where high airflow was achieved with no sources of dripping water. The position is under 50% shade cloth, with good morning sun, but with extra mid to late afternoon shade from a *Melaleuca* tree. The plants are watered approximately three times per week during the summer months, and dry quickly after any watering.

Under my conditions, cork has proven to be the superior host. Early attempts with *Casuarina* or tree fern mounts resulted in failures. I found that the *Casuarina* in particular tended to deteriorate very quickly once cut, swiftly killing an otherwise happy orchid. When selecting and mounting on a cork slab, I always mount the plant on a vertical plane in the middle of the slab. Some specific cultivars grow upwards, whilst others turn and grow downwards. When the plant reaches the extent of the slab, I turn the slab upside down.

Dendrobium cucumerinum has proven to be susceptible to scale attack due to the comparatively dry conditions which I provide. I choose not to grow it under a solid roof, as scale outbreaks were observed with more regularity. I prefer to grow on the dry side and manage scale instead of moving to nominally moister areas and suffer rotting issues. I fertilise with a weak solution as per other epiphytic orchids. My flowering season for *D. cucumerinum* peaks in November and continues sporadically through to mid-autumn.

Reference

Dockrill AW 1992 *Australian Indigenous Orchids* 2nd Ed. Surrey Beatty and Sons, Chipping Norton, New South Wales.

Owen Sengstock has a strong interest in Australian native orchids and is an avid bush walker where he has made observations on the in situ growing condition of some native orchids. He attempts to replicate these conditions in his bush house environment.

Liparis coelogynoides 'Eungella Dreaming' CBR-AD-ACC/ANOS 2021 (NSW)

Text and photos Gerry Walsh | rocklilyman@gmail.com

At a meeting of the ANOS New South Wales Judges Panel held in February 2021, I took along my one specimen of this unique orchid. Unique is a very appropriate description because the specimen is the only example of *Liparis coelogynoides* (F.Muell.) Benth. 1873 I am aware is known to have originated from the Eungella region, inland of Mackay, in tropical Queensland. If other specimens have been collected in the past, no public record has come to my attention.

In June 1993 I visited the small town of Eungella. At the time, the last logging of rainforest in the wet tropics was winding down. A small ramshackle nursery was selling all manner of native orchids that had been legally collected from logging sites. Quite literally, there were truckloads of *Dendrobium speciosum* var. *curvicaule* on the site. It was these that I was particularly interested in seeing.

The proprietor and I spoke about many species for half an hour or so. He led me to a table, and he drew my attention to a small plant that he had set aside. He asked if I knew what species it was. My first thoughts were that it looked like *L. coelogynoides,* and I explained that it was at least 800 km north of where the species was known to occur. He was emphatic that it came from a logging site nearby. He had not one species in the nursery that wasn't rescued at Eungella.

The specimen consisted of three acorn sized bulbs; two were older and the leading one was nearly mature. The man told me it was the only example of this style of orchid he had ever come across. I was quite intrigued, so I purchased the tiny thing for $3. Highway robbery, I protested!

Eventually, when it bloomed for me, I considered it to be *L. coelogynoides*, but it had a few distinctly different characteristics. Firstly, it bloomed about six weeks after typical New South Wales specimens had finished and continues to do this after 28 years of captivity. The racemes are generally longer as well. The flower colour of my specimen is much paler, being an ivory white with no sign of orange hints as in the southern forms.

Over the years I have made enquiries with many growers and consulted literature and online resources. Nowhere have I found a single report of *L. coelogynoides* being found at Eungella. During five or six return visits, I have kept a lookout for another specimen and drawn a complete blank. My specimen would seem to be unique for now, but other specimens must exist in those vast forests. I did lodge some racemes with the Canberra Botanic Gardens quite a while ago now. I have no idea if that specimen was ever examined or kept. The three bulbs eventually grew into quite a large specimen plant. Every March it sends out masses of beautiful racemes and many an observer has been totally impressed by this fascinating orchid. I had no issues growing it on a large hunk of Dicksonia tree-fern fibre. I have given a few pieces to two other growers. I have not been successful in setting seed pods on my plant despite trying numerous times. My next task will be to break up the specimen into numerous smaller pieces and grow as many plants as I can. It's called an insurance policy.

I took the lovely specimen along to the Judging Panel meeting in February to display it for those present to see for themselves. In their wisdom, they decided to grace it with the three awards as listed above. I do admit that it looked magnificent!

A fellow judge contacted me later to say that a friend who resides at Sarina, just south of Mackay, was given a plant of *L. coelogynoides* which may have originated in the Mackay district which includes Eungella. It was in a box of assorted species assumed to be from the local region. Details are quite sketchy at this point and enquiries and future blooming in the next year or so may be rewarding. At this moment the origin of this plant must be considered unknown.

Liparis coelogynoides 'Eungella Dreaming'
CBR-AD-ACC/ANOS 2021 (NSW)
whole plant

Liparis coelogynoides 'Eungella Dreaming'
CBR-AD-ACC/ANOS 2021 (NSW) close up of flower

Note from Gerry Smee, Registrar of Judges, New South Wales

The exhibit had 62 inflorescences with 1200 flowers and 15 buds. The colour of the exhibit was light green to pale mauve, generally a green tone with paler to yellowish tepals with opalescent lustre. It was considered different from and better than other members of the species.

Gerry Walsh is an ANOS judge and has a special interest in Dendrobium speciosum.

Towards Green-Flowering *Dendrobium* Section *Dendrocoryne* Hybrids

Text by Richard Johnson | richard.g.johnson@outlook.com

Summary

The twelve species within *Dendrobium* section *Dendrocoryne* tend to produce mainly yellow, orange, cream, white, and purple \ mauve flowers. Green, while not commonly observed, is occasionally found in *Dendrobium adae*, *Dendrobium fleckeri* and *Dendrobium gracilicaule*. Green is also found in *Dendrobium tetragonum*, however, this species is generally used in hybridization to add dark red \ purple colours. The percentage of background species *D. fleckeri*, *D. gracilicaule* and *D. adae* is important in producing green-flowered offspring, and so is the percentage of colour dominant species such as *D. kingianum* or *D. tetragonum*, which reduce the propensity of the hybrids to have green flowers.

Introduction

Dendrobium is one of the largest and most diverse orchid genera. It comprises over 1300 species in eighteen sections, and over 60 species occur in Australia and its offshore territories. The twelve species of sect. *Dendrocoryne* grow predominantly along the eastern coast of Australia. *Dendrobium moorei* and *D. gracilicaule occur* on Lord Howe Island and New Caledonia respectively. Only a handful of species have been used extensively as a direct parent in hybrids. *Dendrobium speciosum* and *D. kingianum* dominate, and *D. tetragonum* and *D. falcorostrum* are used to a lesser degree. The remaining species have been used comparatively rarely, or not at all in the cases of *D. finniganense* and *D. callitrophilum*.

It is easy to understand the reliance on these species as the basis for the vast majority of *Dendrocoryne* hybrids as each possesses characteristic benefits which can prove extremely attractive. *Dendrobium speciosum* passes on floriferousness and strong peduncles which allow hybrids to produce racemes bearing around 20 or more good-sized well-presented flowers. *Dendrobium speciosum*, the most floriferous species of *Dendrobium*, has been used not only to produce Australian species-based hybrids but also hybrids with exotic Asian species. *Dendrobium. kingianum* imparts its more compact form and filled-in flower shape as well as a range from colours of white through to purple. *Dendrobium tetragonum* can pass on red/purple markings and its unique shape, while *D. falcorostrum* provides a compact form, floriferousness and ability to allow the colour from the second parent to be passed on more strongly.

The reliance on a small number of species reduces the range of colours commonly found amongst hybrids with sect. *Dendrocoryne* species to predominantly yellow, cream, white, and purple/mauve. There are other species with the potential to produce colours outside of the 'standard' palette. *Dendrobium gracilicaule*, *D. adae* and *D. fleckeri* have the potential to produce green hybrids. The seedlings of such crosses generally revert to the more commonly found colours for each species such as yellow \ cream for *D. gracilicaule* and orange/yellow for *D. fleckeri*. The proclivity of these hybrids to produce green flowers may increase with the percentage of each species in their background, but not to the point that the majority of the offspring can be expected to flower green.

Take for example an early hybrid registered by Wal Upton in 1986, *D.* Green Goddess. This hybrid is *D. adae* x *D.* Susan and has a background species composition of 50% *D. adae*, 25% *D. falcorostrum* and 25% *D. gracilicaule*. It is difficult to find many photographs of early hybrids, however, anecdotal evidence suggests that most seedlings of this cross produced pale yellow to cream flowers, with only a relatively small number producing a true green. Here I record some green-flowered hybrids and discuss the influence of species on colour.

Species	No. hybrids with species as one parent	Colour influence predicted
D. adae	14	White, cream, pale yellow, pale green
D. aemulum	6	White, cream
D. falcorostrum	55	White
D. fleckeri	23	Apricot, yellow, pale green
D. gracilicaule	19	Yellow, cream, pale green
D. jonesii	22	White, cream
D. kingianum	120	White, mauve, purple
D. speciosum	237	White, cream, yellow
D. tetragonum	64	Purple, green, orange, yellow, red

Table 1. Predicted colour influence of *Dendrobium* sect. *Dendrocoryne* species in hybrids.

The Chemistry of Colour

Orchids, in common with all flowering plants, produce a floral display that can attract the pollinators which facilitate their reproduction. The floral displays are also the major reason behind their appeal to us and explain why people have kept orchids as ornamental plants since before Confucius in around 500 BC.

Colour can play a part in directing pollinators to specific areas of the flower. In *Dendrobium speciosum* insects are directed to the reproductive structures by colour variation on the perianth, which includes an area of high ultra-violet reflection near the centre as well as a coloured ridge running along the labellum (Glover 2009). In *Dendrobium kingianum* it is suggested that pollinators are attracted by a combination of the floral display and a range of fragrance chemicals emitted from the flowers. These chemicals have been shown to remain similar regardless of flower colour (Adams and Lawson 1995).

Three groups of pigments are generally understood to be responsible for the colours found in most flowering plants. These are chlorophylls, anthocyanins and carotenoids.

Chlorophylls are generally responsible for the green colour found in the flowers of some species and hybrids, with its presence confirmed in the flowers of several commercially important species and hybrids such as *Cymbidium lowianum*. Anthocyanins are accountable for the red, blue and purple colours found in flowers as well as the reddish colouration of new growths sometimes seen in plants kept in high light environments. Finally, carotenoids are responsible for the yellow and orange colours. The degree to which the various compounds which make up these three groups of pigments affect the colour of the flowers can vary depending on physical and chemical factors.

Temperature has a major influence on flower colour. High temperatures lead to lighter colours due to reduced anthocyanin content, and low temperatures can result in the formation of darker coloured flowers because of an increase in anthocyanin production. Light also influences flower colour. Shaded conditions greatly favour the production of chlorophyll-based pigments and to a lesser degree those of the carotenoid group, while inhibiting the build-up of anthocyanins. Several chemical factors influence flower colour including pH, plant hormones and certain minerals.

In addition to the pigments responsible for producing the individual colours, the structure of the cells that comprise the floral tissue, and the distribution of pigments within these cells, can also dramatically affect the appearance of flowers. Such structures are called 'photonic', meaning that they have optical properties. An example of the impact of photonic structures on flower appearance is the Mediterranean mirror orchid *Ophrys speculum*, where the flat outer cells of the speculum produce a glossy, almost mirror-like, surface for which the species is known (Vignolini *et al.* 2012).

Flowers may open pale green and deepen or fade in colour as the flower opens and sets fully. Chlorophylls present as the bud develops may degrade upon opening and be replaced by other pigments. Flowers that maintain a green colour over the life of the flower, such as some *Cymbidium* species, have been shown to maintain their levels of chlorophyll.

In the flower industry, research centres around genetic

Hybrid	Species background composition	Comments
D. Laurell	34% *D. speciosum* 25% *D. tetragonum* 25% *D. gracilicaule* 16% *D. kingianum*	
D. Linda Browne	25% *D. kingianum* 25% *D. fleckeri* 25% *D. jonesii* 12.5% *D. speciosum* 12.5% *D. gracilicaule*	
D. Green Goddess	50% *D. adae* 25% *D. falcorostrum* 25% *D. gracilicaule*	
D. Green Gold	25% *D. falcorostrum* 25% *D. gracilicaule* 25% *D. fleckeri* 25% *D. jonesii*	
D. Green Star	37.5% *D. gracilicaule* 37.5% *D. fleckeri* 25% *D. tetragonum*	
D. Bert Bushell	25% *D. falcorostrum* 25% *D. gracilicaule* 25% *D. speciosum* 12.5% *D. fleckeri* 12.5% *D. kingianum*	Most range from cream through to yellow or apricot however *D.* Bert Bushell 'Green Gold' opens a vibrant green before fading to yellow
D. Double Two	50% *D. adae* 25% *D. gracilicaule* 25% *D. speciosum*	
D. Hastings	50% *D. fleckeri* 50% *D. kingianum*	Green is uncommon, usually mauve and white
D. David Adams	37.5% *D. jonesii* 37.5% *D. fleckeri* 25% *D. kingianum*	A mix of colours and combinations, pure green is seen occasionally
D. Yarra Song	37.5% *D. kingianum* 18.8% *D. fleckeri* 18.8% *D. jonesii* 18.8% *D. speciosum* 6.3% *D. gracilicaule*	Flowers tend to open pale green before fading to cream, yellow or mauve
D. Valley Delight *	43.8% *D. tetragonum* 28.1% *D. speciosum* 15.6% *D. kingianum* 12.5% *D. bigibbum*	
D. Balnarring	57.8% *D. speciosum* 21.1% *D. tetragonum* 14.8% *D. kingianum* 3.1% *D. falcorostrum* 3.1% *D. fleckeri*	
D. Australian Artist	56.3% *D. speciosum* 20.3% *D. kingianum* 10.9% *D. tetragonum* 6.3% *D. fleckeri* 6.3% *D. falcorostrum*	Usually cream/yellow and mauve/purple, occasionally some pale green with purple markings
D. Yarra Quest *	60.9% *D. speciosum* 23.4% *D. kingianum* 12.5% *D. tetragonum* 3.1% *D. bigibbum*	Some pale green/white combinations, usually lemon and yellow with purple markings

Table 2: Hybrids Observed to Produce Green Flowers

D. Yarra Cloud	43.8% *D. speciosum* 37.5% *D. kingianum* 6.3% *D. fleckeri* 6.3% *D. gracilicaule* 6.3% *D. jonesii*	Rarely a pale pastel green, mainly white
D. Yarra Ranges	75% *D. kingianum* 18.8% *D. speciosum* 6.3% *D. gracilicaule*	Rarely pale green, usually white
D. Bill Dobson	37.5% *D. speciosum* 25% *D. gracilicaule* 12.5% *D. falcorostrum* 12.5% *D. tetragonum* 6.3% *D. fleckeri* 3.1% *D. kingianum* 3.1% *D. jonesii*	Usually yellow, rarely pale green

* *D.* Valley Delight and *D.* Yarra Quest contain a very low percentage of *D. bigibbum* which is highly unlikely to be contributing to any green progeny.

Table 2 Contd.: Hybrids Observed to Produce Green Flowers

manipulation to modify specific gene expression and create new colours. Australian dendrobiums, with the notable exception of *D. bigibbum*, are not considered valuable enough to expend the necessary resources on this level of research.

Influential Species in Dendrobium section Dendrocoryne

The twelve species within this section have been used as parents of hundreds of registered Australian *Dendrobium* hybrids. Four species dominate the hybrid parentage. When analysing the results of a hybrid, it is important to understand the various species in the background and the characteristics that would be expected to be passed on. The degree to which these characteristics are expressed decreases with the number of generations. Table 1 lists each *Dendrocoryne* species with the frequency of use as a direct parent and their expected colour influence on the resulting progeny.

Dendrobium adae has been used as a direct parent a small number of times, mostly during the late '70s and '80s, with no hybrids being registered since *D.* Peach Maron in 1998. The species has around six relatively filled-in flowers per raceme in white, cream, pale green or yellow. Of the resulting hybrids, only a few were used to produce further hybrids, and these lines generally only progressed a couple of generations. A notable exception is *D.* Star Imp registered in 1979 by V. and N. Jupp. Although *D. adae* is a parent, its influence is difficult to spot as the other parent, *D. tetragonum,* dominates plant form and flower shape in most examples. *Dendrobium adae* is not likely to be very influential in producing green flowers.

Dendrobium aemulum has been the least used of any sect. *Dendrocoryne* species to create a first-generation hybrid. Of these, only *D.* Emmy has been used in further hybridisation, and the resulting lines only progressed a couple of generations before being abandoned. The species has racemes carrying around 12 white to pale cream flowers. The flowers have long, thin segments which may open to varying degrees and have the tendency to be rather clumped. These characteristics are not considered particularly attractive in potential hybrids, which may go some way to explain the low use in hybridisation. Green flowers are not a likely outcome in hybrids.

Dendrobium falcorostrum is one of the most widely used species in sect. *Dendrocoryne* in hybridisation. The species was first used with *D. speciosum* to create *Dendrobium* Andrew Persson, registered in 1960 by G.H. Slade. Many further hybrids were created predominantly in the '70s, '80s and '90s including the primary hybrid *D.* Peter, made by crossing with *D. fleckeri*. The species can produce up to 20 white flowers which tend to be clustered. The major advantage that *D. falcorostrum* brings is its capacity to allow colour, possibly green, from the other parent to be transferred to the offspring. An excellent example of this is seen in *D.* Wayne

Dendrobium gracilicaule. Photo P. Adams

Dendrobium David Adams 'Peaches and Cream'. Photo R. Johnson

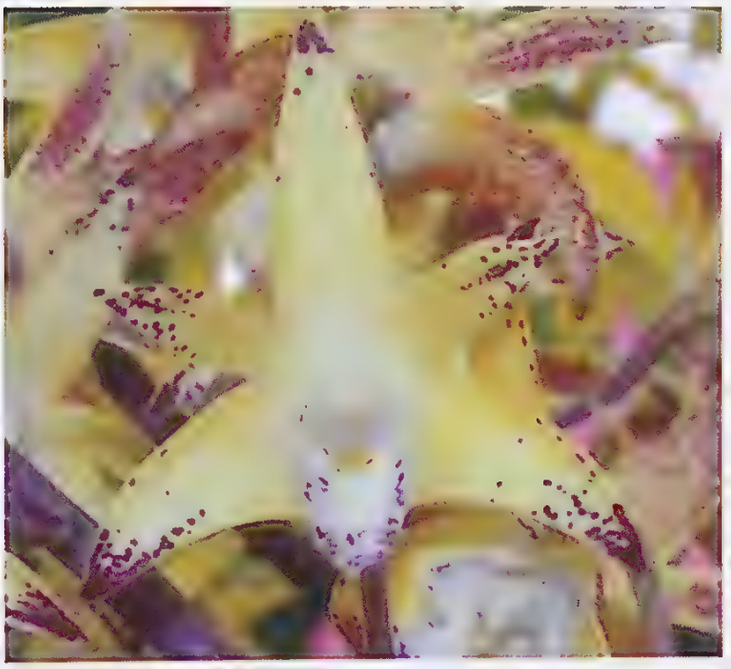
Dendrobium falcorostrum. Photo R. Johnson

Dendrobium Bert Bushell. Photo J. Cutajar

Dendrobium Hastings. Photo P. Adams

Dendrobium Laurell. Photo R. Capell

Dendrobium Bill Dobson. Photo P. Adams



Dendrobium Australian Artist. Photo R. Johnson

Dendrobium Yarra Song 'Green Jade'. Photo P. Adams

Dendrobium Linda Browne. Photo R. Johnson

Turville (*D. falcorostrum* x *D.* Flinders) which has produced seedlings with white flowers and striking pink/purple spots and streaks.

Dendrobium fleckeri is not commonly used as a direct parent but is an important species in hybridisation because it can pass on desirable rich apricot tones. Many modern hybrids which exhibit orange- or gold-coloured flowers have *D. fleckeri* in their background. If traced back, the lineage of such hybrids generally contains an early cross made with *D. fleckeri* such as *D.* Sunglow or *D.* Peter. The species itself has 1–4 clustered flowers on a raceme, in shades of apricot, yellow or light green and has long thin canes. It may allow the penetration of green colour in hybrids.

Dendrobium gracilicaule has been used sparingly as a direct parent, with 19 hybrids registered. It is notable that less than one-third of these have progressed to a second generation. Most of the crosses were created in the late '80s and '90s, with years passing before it was used in combination with *D.* Zip to create *D.* Tym-Tam in 2015. A possible reason for lack of use is the relatively small size and cupped nature of the flowers and the fact that for some growers, plants generally favour mounts rather than pot culture. The flowers, 5–30, are most commonly yellow to cream, with some few individuals exhibiting pale green. Limited line breeding has taken place with *D. gracilicaule* to produce a higher proportion of green flowering progeny, however, the limited number of seedlings seen by the author suggests that yellow or

cream is the most prevalent colour for this species, regardless of the colouration of the parents used.

Dendrobium jonesii has been used sparingly, with the majority of hybrids created in the '80s and '90s. In contrast to *D. gracilicaule,* over half of the initial crosses using *D. jonesii* were in turn used in further breeding lines. By far the most successful in terms of further hybridization was *D.* Eureka (*D. fleckeri* x *D. jonesii*), created in 1980 by David Cannon, which was used in the creation of 41 further hybrids. The species produces 15–35 white to cream flowers per raceme. The influence of *D. jonesii* on green flowering is not known.

Dendrobium kingianum has been used in over 100 hybrids, the second most widely used species within sect. *Dendrocoryne*. The use of *D. kingianum* as a hybrid parent began in 1892 when it was crossed with *D. speciosum* by Lawrence to create *D.* Speciokingianum (now a synonym for *D.* Delicatum) and has progressed over the next 100 plus years to the point where there are many hybrids dominated by this species. It produces 3–12 white, mauve or purple flowers. This relative floriferousness, the short stature of the plants and the flower presentation can be expected to be passed on to their progeny. *D. kingianum* is usually highly dominant for colour and shape for several generations.

Dendrobium speciosum is by far the most widely used species and has been used in over 230 hybrids. As well as hybrids within sect. *Dendrocoryne*, it has been used extensively in intersectional crosses with *Dendrobium* sections *Phalaenanthe*, *Spatulata* and *Latouria*. It is easy to understand the attraction of using *D. speciosum* in hybridisation, with mature specimens boasting multiple racemes, each potentially carrying more than 100 cream, white or yellow flowers, depending on the variety. It is considered to be dominant for flower shape and plant size.

Dendrobium tetragonum is a very important species in hybridisation. Present in over 60 hybrids, it is used for its colour and shape. Many notable hybrids such as *D.* Avril's Gold can trace back their characteristic red/purple spots and or streaks to this species. There are several taxa (Adams 2011) that differ in flower size and colour. Although hybrid registrations don't include species parentage to the varietal or subspecies level, most hybrids have used var. *giganteum* or var. *tetragonum*. This is due to their wide availability in collections. These taxa exhibit pale yellow or green flowers with purple or red streaks and spots. *Dendrobium tetragonum* is considered dominant for both shape and colour, and *D. tetragonum* var. *giganteum* adds the possibility of multiple flowerings to the resulting cross.

Each species possesses unique attributes which they pass on to varying degrees to their progeny. Three species dominate the majority of modern sect. *Dendrocoryne* hybrids: *D. kingianum, D. speciosum* and *D. tetragonum.* The first two species also dominate the ANOS quality awards, with *Dendrobium speciosum* being awarded almost four times as often as the other species combined.

The use of three main species has reduced the range of colours to mainly cream, white, mauve, purple and varying shades of yellow. *Dendrobium tetragonum* flowers may exhibit shades of green, but it is likely that the plants chosen for use in hybridisation are those that exhibit the brightest purple/red markings, reducing the likelihood that green is produced in future generations.

Of the three main species that may produce green-flowering hybrids, *D. adae*, *D. fleckeri* and *D. gracilicaule,* various factors such as floriferousness, flower shape and in some cases, ease of culture, have reduced their use. In addition, green is a colour found only rarely in each species, and it does not appear to breed true, as shown with the limited line-breeding attempts to date.

Green Flowering Hybrids

Green is a colour not commonly found in hybrids in sect. *Dendrocoryne* but green-flowered plants have arisen in several hybrids. It is difficult to determine exactly which colours were produced by each cross involving these three species as the majority were produced in the 1970s and '80s, with few examples remaining in collections today.

Many hybrids created with *D. adae*, *D. fleckeri*, or *D. gracilicaule* are expected to flower in varying shades of yellow or cream, with green occasionally or rarely expected. Hybrids created with higher percentages of the main colour dominant species, *D. kingianum*,

D. speciosum and *D. tetragonum* greatly reduce the incidence of green flowers.

Several growers were consulted about hybrids that had produced green flowers (Table 2). A wide range of hybrids have produced green-flowered plants. This list is preliminary, and no doubt other crosses have produced green flowers.

There appear to be at least two factors that determine the likelihood of a cross producing green flowers. Firstly, hybrids containing *D. adae*, *D. fleckeri* or *D. gracilicaule* with a higher percentage of one, two or all of these species seeming to increase the likelihood. The three hybrids containing the word 'green' in their name each contain at least 25% of several of these species. Just as important is the percentage species composition of the three colour dominant species (*D. kingianum*, *D. speciosum*, or *D. tetragonum*). Once the composition of these approaches 20–30%, the incidence of green flowering plants in the progeny decreases. *Dendrobium kingianum* in particular seems to inhibit the creation of green flowering offspring, especially above 30% species background composition (Adams 2020).

Future Breeding

Future breeding within sect. *Dendrocoryne* is not likely to reliably produce green flowering plants unless parents are carefully selected. It is possible to breed hybrids where the incidence of green flowers can be increased by careful selection of parents. Hybridising should be centred around the three species identified, with a good starting point being the selection of green-flowered examples. Crossing these hybrids to *D. falcorostrum* to re-create the primary hybrids *D.* Leonie Jane, *D.* Peter and *D.* Susan may produce a small percentage of green-flowered plants which could then be crossed with green-flowered hybrids containing low percentages of *D. kingianum*, *D. speciosum* and *D. tetragonum*, such as *D.* Green Goddess or *D.* Green Gold.

The potential of *Dendrobium tetragonum* var. *cacatua* could also be explored. This taxon commonly produces flowers with a marked decrease in the amount of red/purple spots and streaks prevalent in the species other forms, and often flowers in pale green or yellow. The degree to which this colouring is passed on to its offspring is unknown. It would be interesting to see the results of crossing this to *D. falcorostrum.*

A third direction is to use plants from *Dendrobium* sect. *Latouria*, as several reliably produce green flowers. To date only two hybrids combining *Dendrobium* sect. *Dendrocoryne* and sect. *Latouria* have been registered. *Dendrobium bifalce* has been crossed to *D. falcorostrum* (*D.* Aussie Stripes) and *D. speciosum* (*D.* Golden Spurs). These crosses are likely to have some capacity to produce green flowers. *Dendrobium convolutum* x *D. falcorostrum* would be an interesting combination as it may produce a significant number of green-flowering plants.

Acknowledgements

Peter Adams and Sheryl Lawson assisted with the analysis of hybrid lists and some breeding results.

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Richard Johnson is a keen grower of Australian orchids and is an ANOS judge-in-training in Victoria.

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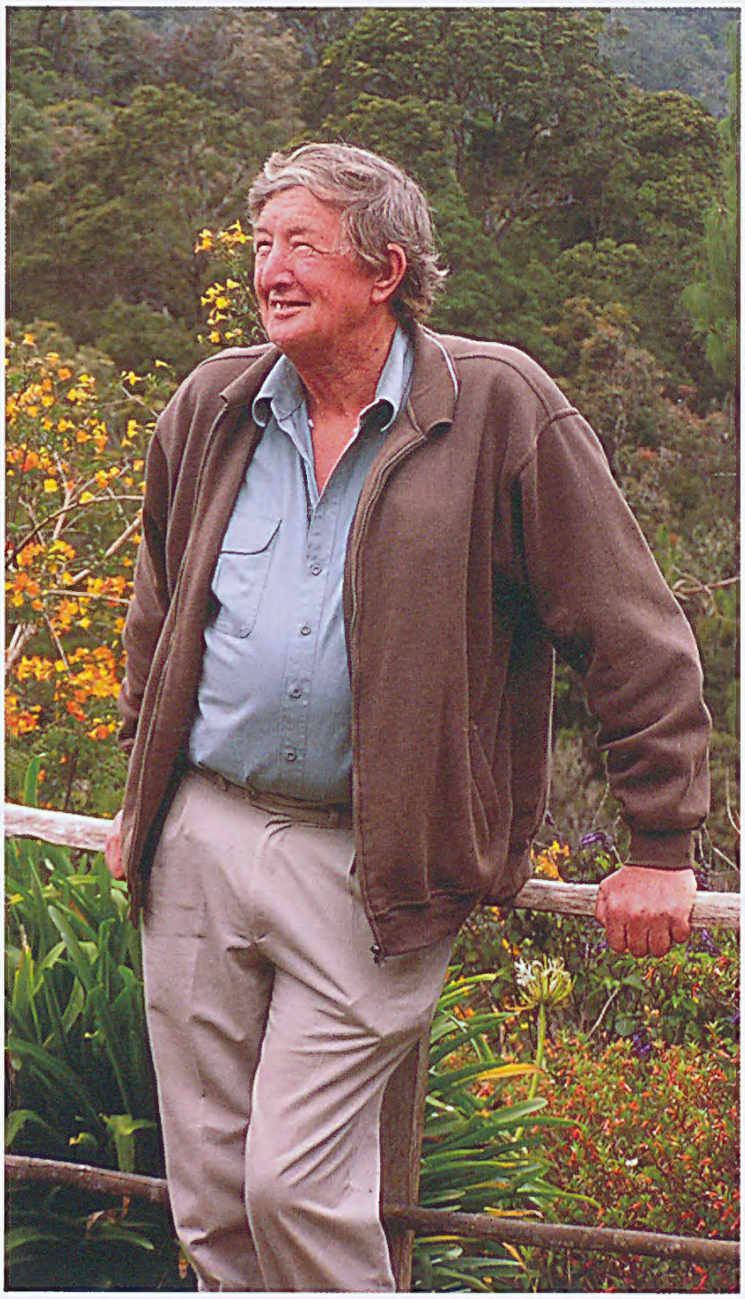

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Vale Dr Geoff Stocker PhD BSc (For.) Dip. For. (1941–2021)

Geoff was born 28 May 1941, in Lorn (Maitland, New South Wales) and raised on the family dairy farm in the Hunter Valley. He earned a scholarship from Maitland Boys High to commence a forestry degree at Armidale, New South Wales in 1957, then studied for a Diploma of Forestry at the Australian Forestry School, Yarralumla, Australian Capital Territory, and graduated with a BSc in Forestry at the University of New England in 1963.

Geoff was a crack pistol shot and was Northern Territory champion for ten years. In 1968 he represented the Northern Territory in the Australian Championships and Olympic trials in Melbourne.

Appointed to the Forestry and Timber Bureau at Berrimahin the Northern Territory, Geoff's early focus was the establishment of *Pinus* plantations on Melville Island and elsewhere in the Top End and he made visits to Central America collecting suitable provenances of *Pinus caribaea* for basic pine breeding in northern Australia.

In 1971 Geoff and his wife Jacquie moved to the Atherton Tablelands in northern Queensland as director of the then Queensland Regional Station (QRS) of the Forest Research Institute, an arm of the Commonwealth Forestry and Timber Bureau. He was Principal Research Scientist and Head of QRS (which became the CSIRO Tropical Forest Research Station) in Atherton from 1971–85.

Moving from CSIRO, Geoff extended his professional interests to Papua New Guinea, being appointed Professor and Head of the Forestry School at the University of Technology in Lae, and Director of the Forestry Institute Papua New Guinea.

Geoff was highly respected in the local community and served as a councillor in the Eacham Shire and then in the Tablelands Regional Council. He was Deputy Mayor of TRC from 2014 until he retired in 2016.

Geoff and Jacquie already had an established orchid and Bromeliad nursery at their 'Los Cerros' farm at Jaggan near Malanda on the tablelands, and Geoff was able to introduce numerous species new to horticulture, especially several spectacular high-altitude plants from Papua New Guinea. He was still working with these until a few weeks before he passed away. He was also working on a modified tissue culture media in association with Phil Spence and was discussing the findings with Phil only a few days before he died.

He co-authored the book *Dendrobium and its Relatives,* with Bill Lavarack and Wayne Harris. This is a lasting legacy to the immense knowledge of all three authors. Geoff had a Eucalyptus (*Corymbia stockeri*) and two orchids, *Dendrobium stockeri* and *Bulbophyllum stockeri,* named in his honour, a fitting professional recognition of his love of botany, tropical forestry and orchids.

He was a quiet, unpretentious achiever who was much admired and respected for his wise counsel to his family, friends and colleagues. The orchid world is diminished with his passing but is a better place because he was here. Our sympathies go out to his wife Jacquie, daughters Lucy and Elise and their families.

Bruce Gray

Dendrobium gracilicaule *Photo Peter Adams*